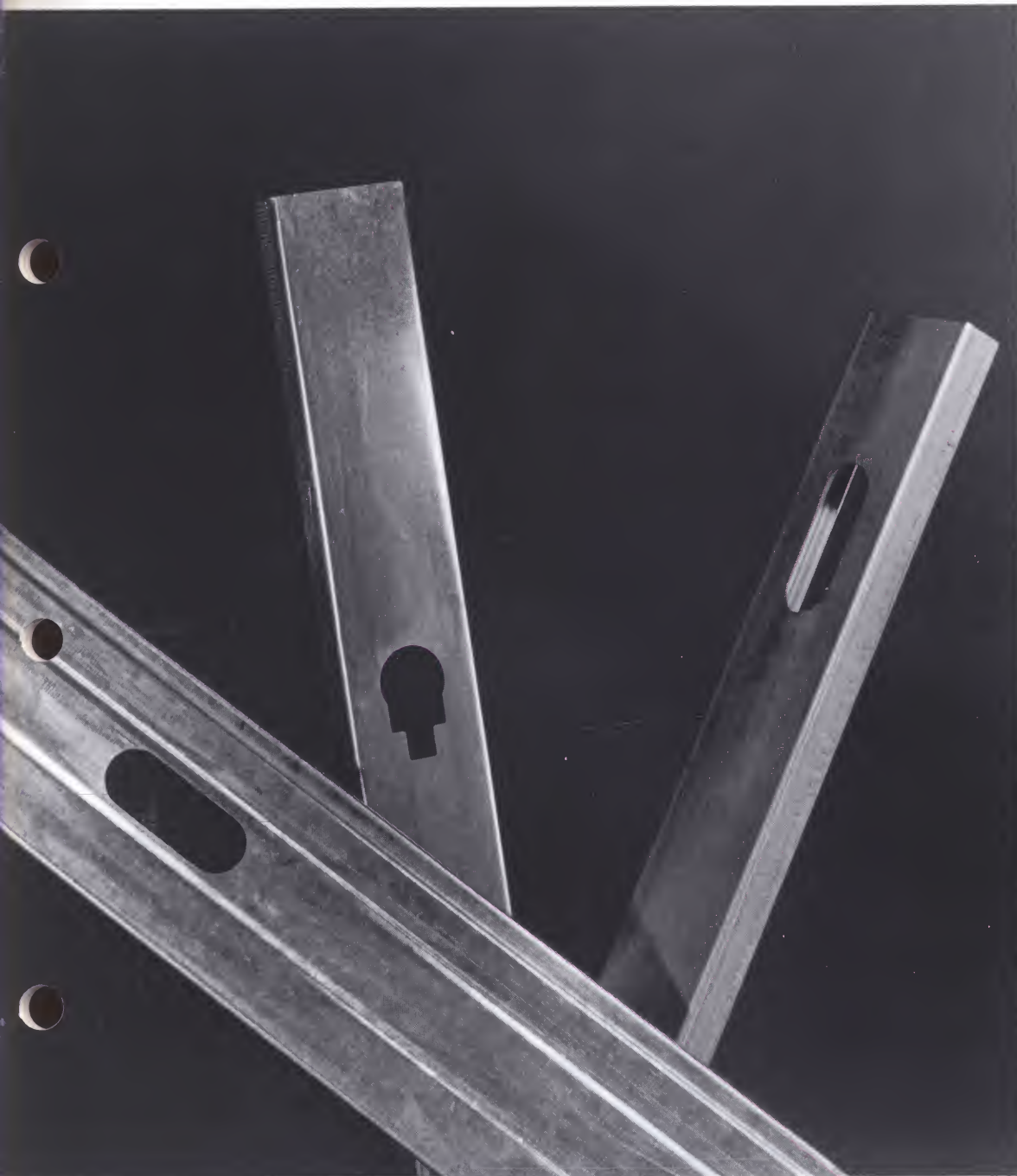


STEEL FRAMING SYSTEMS

TECHNICAL INFORMATION

UNH 05400
BUYLINE 6040



Studs
Runners
Joists
Accessories

Text Includes:
Physical Properties
Load Limitations
Limiting Heights
Fire Test Data



UNIMAST
INCORPORATED

The construction industry's most trusted steel products.

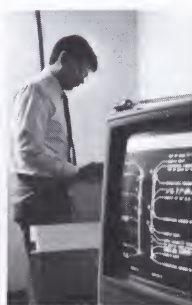
Unimast Products	2
Unimast Services	2
Unimast Technical Support	2
How To Use This Manual	3
Member Designation	3
Product Description	
Light Steel Framing	4
Drywall Framing	5
Section Properties	
Light Steel Framing	6
Drywall Framing	9
Light Steel Framing	
Joist Load Tables	10
Headers	12
Floor Bridging	12
End Clip & Pipe Opening Reinforcement	12
Web Stiffening	13
Axial Load Tables	14
Curtain Wall Limiting Heights	22
Drywall Framing	
Design Data	27
Curtain Wall Slip Track	28
Curtain Wall Slide Clip	28
Control Joints	29
Lateral Bracing	30
Diagonal Racking Bracing	31
Attachments	
Welds, Screws and Power Driven Fasteners	32
Fire Test Data	34
Architectural Specifications	38
Design Considerations	39
Product Availability	39
Support Literature	39
Manufacturing Locations and Sales Offices	39



All products are precision formed from quality mill steel.



Finished product is unitized for job ready loading.



Unimast technical support is the finest available.

This publication contains the latest technical information available at the time of printing on Unimast Steel Framing. Unimast reserves the right to make improvements in, or change materials and/or configurations of, any products in this literature, without prior notice or obligation. For the latest information or technical assistance, contact your local Unimast Technical Departments or Marketing Departments.

Unimast Incorporated is one of the nation's largest producers of construction steel products. The company manufactures, and distributes nationally, light steel framing—studs, joists and runners; drywall framing—studs, runners, resilient channels, furring channels, cold rolled channels; and plastering steel—including metal lath, corner beads, trims and accessory items.

Unimast markets most of these products under its own name. The company also is the exclusive supplier of United States Gypsum Company construction steel products. Those products include special studs and components for shaft wall and area separation wall systems as well as beads, control joints and other metal products made to United States Gypsum Company Specifications.

All Unimast products are manufactured from quality mill steel and precision formed. All products are designed to meet or exceed industry standards established by the American Society for Testing and Materials (ASTM), the American Iron and Steel Institute (AISI) and all major code authorities. For these reasons, Unimast is recognized as the manufacturer of the industry's most trusted steel products.

Unimast Service

Unimast's commitment to service sets it apart from its competitors. While other manufacturers produce construction materials, none consistently offer the reliable sales support, in-depth technical assistance and on-time delivery Unimast provides. The company's commitment to service extends to all areas of operation, including packaging for safety, color coding and labeling for inventory, special-count bundling and job-ready loading. It's what you expect from a leader. It's what you get from Unimast.

Unimast Technical Support

Unimast's technical support personnel are available to assist architects, engineers, contractors and dealers in specifying those assemblies and components that will safely and economically meet design objectives.

Technical services include answers to product application questions, development of details and framing drawings, and value engineering to ensure cost effective construction.

This manual, "Steel Framing Systems Technical Information" contains information on the framing of load-bearing systems, curtain wall systems and interior nonload-bearing partitions. Load tables and limiting height tables are for single and, in some cases, double span conditions. Products described include:

1. SJ members—used in load-bearing and curtain wall applications.
2. SN members—designed specifically to meet curtain wall construction requirements.
3. ST members—used in interior nonload-bearing applications.

Many framing systems used in construction projects are more complex, involving cantilevers, spandrels, parapets and unique details. These systems require additional analysis that is not provided within the tables but is available from Unimast's Technical Department at each location.


Section properties and steel specifications vary among manufacturers. Information provided by the Unimast Technical Departments and within Unimast's literature applies only to Unimast's steel framing. For assistance in sizing Unimast's steel framing, call the Unimast sales office nearest you.


The types of Unimast products used for particular applications depends on thickness, coating type, yield strengths, section properties, testing, specifications and standards, such as those established by the American Society for Testing and Materials (ASTM) and the American Iron and Steel Institute (AISI) and code authorities. This publication is designed to assist you in the selection of the correct product for your application.


All sizes, gauges and products may not be available from all manufacturing plants. Contact your sales representative or the Unimast sales office nearest you for information on availability.

Member Designation


Unimast's steel framing carries a three-part code that identifies the size, style and gauge. For example:

362SJ20 — Gauge: 20, 18, 16, 14
 Style: SJ - stud/joist
 CR - runner track
 Size: 362 - 3 3/8"
 40 - 4"
 60 - 6"
 725 - 7 1/4"
 80 - 8"
 925 - 9 1/4"
 115 - 11 1/2"
 135 - 13 1/2"

600SN18 — Gauge: 20, 18, 16, 14
 Style: SN - stud
 Size: 358 - 3 3/8"
 600 - 6"
 800 - 8"

358ST25 — Gauge: 25, 22, 20
 Style: ST - stud
 CR - runner track
 Size: 158 - 1 5/8"
 212 - 2 1/2"
 358 - 3 3/8"
 400 - 4"
 600 - 6"

SJ (3 5/8", 4")



SJ (6" to 13 1/2")



SN Stud



ST stud



CR runner



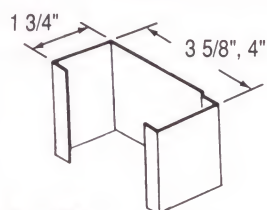
Table 1

Steel Thickness

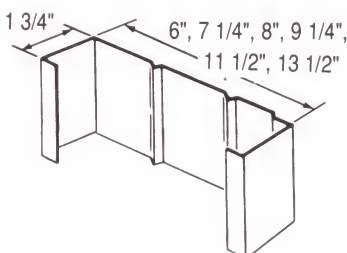
Style	Gauge	Design		Minimum		End Color Code
		in	mm	in	mm	
ST, CR25	25	.0188	.48	.0179	.45	none
ST, CR22	22	.0284	.72	.0270	.69	blue
ST, CR20	20	.0329	.84	.0312	.79	white
SN20	20	.0329	.84	.0312	.79	white
SN18	18	.0438	1.12	.0416	1.06	yellow
SN16	16	.0548	1.40	.0521	1.33	green
SN14	14	.0697	1.78	.0662	1.69	orange
SJ20	20	.0359	.91	.0341	.87	white
SJ, CR18	18	.0478	1.21	.0454	1.15	yellow
SJ, CR16	16	.0598	1.52	.0568	1.44	green
SJ, CR14	14	.0747	1.90	.0710	1.80	orange

Uncoated thickness.

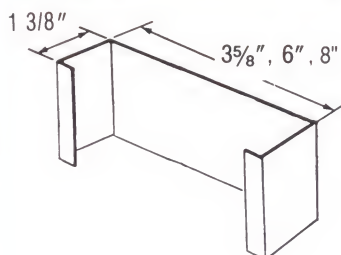
SJ studs



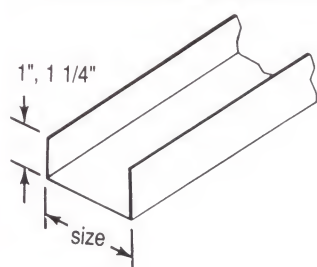
SJ Joist



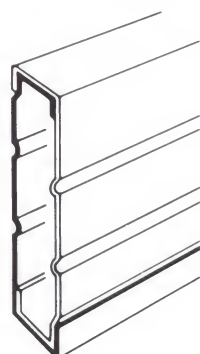
SN Stud



CR runner



Nested joists



Unimast's light steel framing is manufactured from steel (20, 18, 16 and 14-gauge) having yield strength of 40 ksi (40,000 pounds per square inch) for studs and 33 ksi for runners. Members made from 33 ksi and 50 ksi yield strength steel in various thicknesses are also available.

Coatings on light steel framing are galvanized per ASTM A525 or ASTM A591 (A525 equivalent) or aluminum-zinc per ASTM A792.

SJ Studs or Joists

These members are available in web depths of 3 3/8", 4", 6", 7 1/4", 8", 9 1/4", 11 1/2" and 13 1/2". Other select sizes are available on request. SJ members may be used in either load-bearing or curtain wall framing applications. The SJ member is a unique channel-type section which permits nesting. With nesting, two members can be used to increase the structural capacity without an increase in dimension of a single member. Slotted holes, or punch outs, 1 1/2" x 4", are located in the web for installation of cold-rolled channel lateral bracing. The holes also facilitate the installation of plumbing and electrical systems. SJ members are available in custom lengths up to 40'.

SN Studs

These studs are recommended for curtain wall applications only. The 1 3/8" flange is greater than that required for partition studs, adding bearing surface, but less than that required for load-bearing applications. SN studs are available in 3 3/8", 6" and 8" web depths. Other depths are available on special request.

CR Runners

These members are channel-shaped sections used as the top and bottom tracks of stud walls and as end support closures for joists at exterior walls or foundation

walls. They are available in all stud/joist sizes and gauges. Standard leg length on CR runners is 1 1/4". CR members are available in standard lengths of 10'. Special requests for other lengths depend on construction and manufacturing limitations. Call the Unimast Sales Office nearest you for allowable load information, for section and physical properties, and for availability.

Deep Leg Track

CR runners with longer leg depths, used for slip tracks in nonload-bearing construction, are available in 20, 18, 16 and 14-gauge in 10' lengths. Inside web dimension, leg length and gauge must be specified when ordering.

Foundation Clips

Clips 5 1/2" x 5" x 16-gauge and 5" in length are used to anchor header joists and CR runners to the foundation. The clip accommodates 1/2" foundation anchor bolts through a 1/2" x 3" slotted hole which allows for inaccuracies in bolt placement. Prepunched holes provide guides for attachment to joists or CR runners.

End Clips

2" x 2" angles made from 14-gauge steel with prepunched holes for screw attachment are available in 6", 8" and 10" lengths.

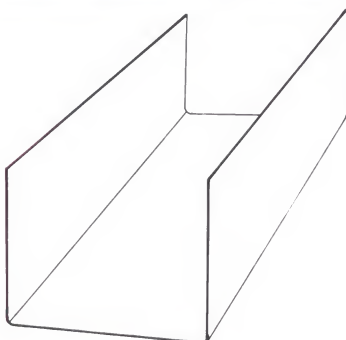
Channel Clips

Standard clips used for the attachment of 1 1/2" cold-rolled channel to studs are available in two sizes: 1 1/2" x 2" x 16-gauge, 3 3/8" length and 1 1/2" x 2" x 16-gauge, 5 3/4" length. Other clips are available by special order.

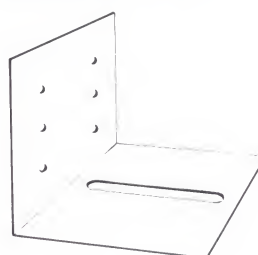
Framing Clips

3" x 3" x 18-gauge clips x 3" length are available as standard clips for various framing details.

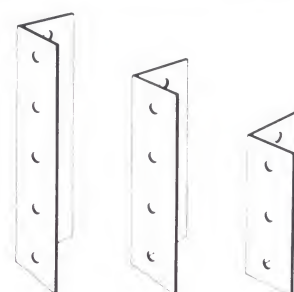
Deep leg track



Foundation clip



End clips



Flat Strapping

Flat steel straps are available in 20-gauge, 1½" x 10' lengths for lateral bracing of studs and 18-gauge for floor bridging. Strapping is also available 18, 16 and 14-gauge in 10' lengths and in varying widths for diagonal bracing to resist racking. Strapping also may be ordered in 100' coils.

Screws

Unimast offers two brands of screws. Unimast's SUPER-TITE Screws are for use with 25, 22, and 20-gauge drywall steel (SUPER-TITE Drywall Screws); for use with 20 to 14-gauge steel framing (SUPER-TITE Drillers); and for use with wood (SUPER-TITE Type W - coarse thread). Unimast also offers BUILDEX Brand Screws which are available for use with drywall steel, light steel framing and wood.

Specials

Custom made angles, straps, runners and clips are also available from Unimast. Contact your Unimast sales office for availability.

1½" Cold-Rolled Channel

This channel is rolled formed from 16-gauge steel. Two coatings are available: galvanized or painted. Used for lateral bracing, the channel is inserted through stud punchouts and attached with welds or clip angles to the studs. It is available in 10', 16' and 20' lengths.

Web Stiffeners

Two-piece web stiffeners are used for joists and studs at points of reaction and concentrated loads to prevent web crippling. They are formed of 14 gauge steel with predrilled holes for screw attachment to webs. Web stiffeners are available in 6", 7¼", 8", 9¼", 11½" and 13½" sizes.

Drywall Framing

Unimast's drywall framing includes the studs and runners manufactured from 25, 22 and 20-gauge steel. These studs and runners are used for interior nonload-bearing applications. 20-gauge drywall studs and runners may also be used for select curtain wall applications.

The studs are designated by ST and the runners by CR. Both are available in 1½", 2½", 3½", 4" and 6" depths.

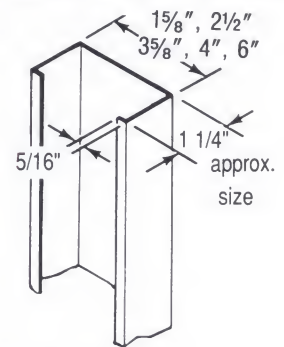
The ST member is nestable because of a slight difference in flange lengths. When nested, two members fit together in the space of one. The ST studs have keyhole-shaped punchouts 24" o.c., except for the spacing of the top two holes which may vary. These key holes are used for convenience in installing electrical and plumbing systems and accommodate cold-rolled channel, when required.

The ST members are available in stock lengths of 8', 9', 10', 12' and 16', depending on size and gauge. Custom length studs are also available. CR runners are available in standard 10' lengths. Special requests for non-standard lengths may be met. Contact the Unimast sales office for availability.

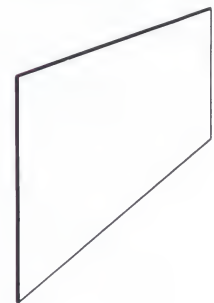
Unimast's 25, 22 and 20-gauge studs meet ASTM C645, "Standard Specification for Nonload (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board". The 25 gauge steel has a minimum thickness of 0.0179" before application of coating and the ST flanges are 1¼" wide. The steel thickness for all gauges of partition studs are shown in Table 1. Structural and Physical Properties are in Tables 7 and 8.

Note: See National Evaluation Service Report No. NER-211 for allowable values and/or conditions of use concerning material presented in this document. National Evaluation Reports are issued by the National Evaluation Service Committee of the Council of American Building Officials (CBO, SBCC, BOCA) and are subject to re-examination, revisions, and possible closing.

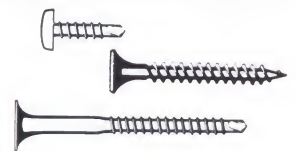
ST stud



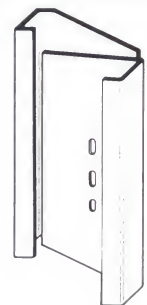
Flat strap bracing



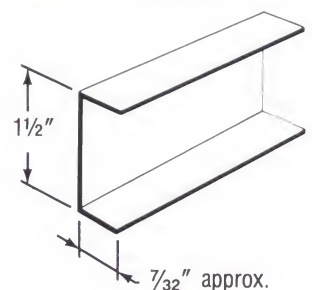
Screws



Web stiffener (2 pieces)

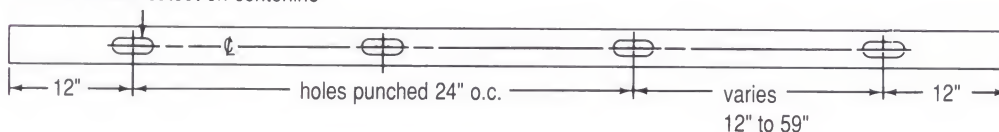


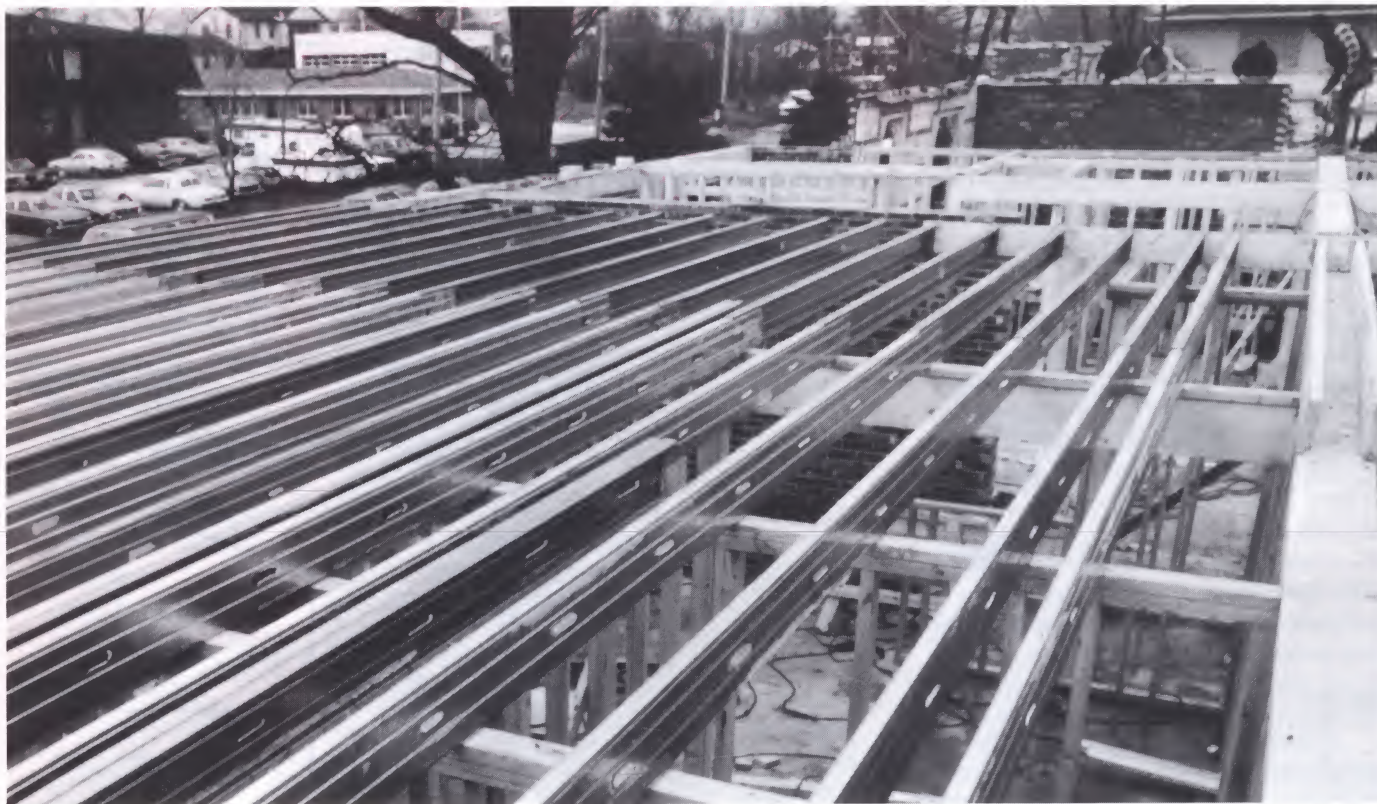
1 1/2" cold-rolled channel



Standard hole placement (unpunched studs available on request)

1 1/2" x 4" web cutout on centerline





Steel framing is excellent for residential or commercial applications.

Table 2

SJ and CR: Physical Properties

SJ									CR						
Member	Dimension (in)				t ⁽¹⁾	ANET ⁽¹⁾ (in ²)	Weight ⁽²⁾		Member	Dimension (in)			A ⁽¹⁾ (in ²)	Weight ⁽²⁾	
	A	B	C	D			(lb/ft)	(kg/m)		A	B	t ⁽¹⁾		(lb/ft)	(kg/m)
362SJ20	3.573	1.552	1.724	0.500	0.0359	0.216	0.97	1.44	362CR20	3.706	1.25	0.0329	0.199	0.696	1.04
362SJ18	3.573	1.552	1.724	0.500	0.0478	0.285	1.24	1.85	362CR18	3.729	1.25	0.0478	0.290	1.01	1.50
362SJ16	3.573	1.552	1.724	0.625	0.0598	0.368	1.59	2.37	362CR16	3.760	1.25	0.0596	0.362	1.26	1.88
362SJ14	3.573	1.552	1.724	0.625	0.0747	0.454	2.00	2.98	362CR14	3.789	1.25	0.0747	0.452	1.58	2.34
40SJ20	3.921	1.552	1.724	0.500	0.0359	0.228	1.02	1.52	40CR20	4.084	1.25	0.0329	0.211	0.734	1.10
40SJ18	3.921	1.552	1.724	0.500	0.0478	0.301	1.30	1.93	40CR18	4.105	1.25	0.0478	0.308	1.07	1.59
40SJ16	3.921	1.552	1.724	0.625	0.0598	0.388	1.67	2.48	40CR16	4.135	1.25	0.0598	0.385	1.34	1.99
40SJ14	3.921	1.552	1.724	0.625	0.0747	0.480	2.09	3.11	40CR14	4.164	1.25	0.0747	0.480	1.67	2.49
60SJ20	5.921	1.552	1.724	0.500	0.0359	0.300	1.27	1.89	60CR20	6.084	1.25	0.0329	0.277	0.969	1.44
60SJ18	5.921	1.552	1.724	0.500	0.0478	0.397	1.63	2.43	60CR18	6.105	1.25	0.0478	0.403	1.40	2.09
60SJ16	5.921	1.552	1.724	0.625	0.0598	0.508	2.08	3.10	60CR16	6.135	1.25	0.0596	0.504	1.76	2.61
60SJ14	5.921	1.552	1.724	0.625	0.0747	0.629	2.62	3.90	60CR14	6.164	1.25	0.0747	0.630	2.19	3.26
725SJ18	7.171	1.552	1.724	0.500	0.0478	0.457	1.84	2.74	725CR18	7.355	1.25	0.0478	0.463	1.61	2.39
725SJ16	7.171	1.552	1.724	0.625	0.0598	0.583	2.34	3.48	725CR16	7.385	1.25	0.0598	0.579	2.02	3.00
725SJ14	7.171	1.552	1.724	0.625	0.0747	0.720	2.95	4.39	725CR14	7.414	1.25	0.0747	0.723	2.56	3.81
80SJ18	7.921	1.552	1.724	0.500	0.0478	0.493	1.97	2.93	80CR18	8.105	1.25	0.0478	0.499	1.74	2.59
80SJ16	7.921	1.552	1.724	0.625	0.0598	0.628	2.50	3.72	80CR16	8.135	1.25	0.0598	0.624	2.17	3.23
80SJ14	7.921	1.552	1.724	0.625	0.0747	0.779	3.15	4.69	80CR14	8.164	1.25	0.0747	0.779	2.75	4.09
925SJ16	9.171	1.552	1.724	0.625	0.0598	0.702	2.76	4.11	925CR18	9.355	1.25	0.0478	0.559	1.94	2.89
925SJ14	9.171	1.552	1.724	0.625	0.0747	0.872	3.48	5.18	925CR16	9.385	1.25	0.0598	0.699	2.43	3.62
115SJ16	11.421	1.552	1.724	0.625	0.0598	0.837	3.23	4.81	925CR14	9.414	1.25	0.0747	0.872	3.08	4.58
115SJ14	11.421	1.552	1.724	0.625	0.0747	1.040	4.07	6.06	115CR16	11.635	1.25	0.0598	0.833	2.90	4.32
135SJ14	13.421	1.552	1.724	0.625	0.0747	1.189	4.60	6.84	115CR14	11.664	1.25	0.0747	1.040	3.86	5.48
135SJ14	13.421	1.552	1.724	0.625	0.0747	1.189	4.60	6.84	135CR14	13.664	1.25	0.0747	1.190	4.21	6.26

(1) Design thickness without coating. (2) Average shipping weight including coating.

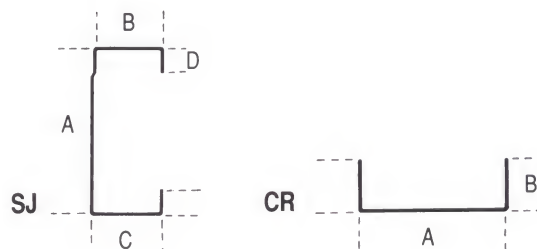


Table 3

SJ: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AET ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y ⁽⁴⁾ (in ³)	J (in ⁴)	C _w (in ⁶)	X _o (in)	j (in)	M _a (k-in)
362SJ20	0.0359	0.2697	0.551	0.273	0.104	0.088	1.429	0.621	0.2136	0.541	0.273	0.085	0.082 ^c	0.0001	0.3007	1.357	2.151	6.557
362SJ18	0.0478	0.3563	0.722	0.395	0.135	0.115	1.423	0.616	0.2713	0.708	0.385	0.111	0.106 ^c	0.0003	0.3870	1.345	2.146	9.247
362SJ16	0.0598	0.4573	0.911	0.499	0.181	0.158	1.411	0.629	0.3341	0.893	0.486	0.147	0.146 ^c	0.0005	0.5703	1.420	2.125	11.678
362SJ14	0.0747	0.5658	1.116	0.611	0.219	0.192	1.404	0.622	0.3917	1.093	0.596	0.178	0.176 ^c	0.0011	0.6833	1.406	2.118	14.293
40SJ20	0.0359	0.2822	0.683	0.341	0.107	0.089	1.556	0.617	0.1792	0.673	0.311	0.091	0.084 ^c	0.0001	0.3631	1.313	2.274	7.464
40SJ18	0.0478	0.3730	0.896	0.447	0.139	0.116	1.550	0.611	0.2576	0.882	0.437	0.117	0.108 ^c	0.0003	0.4679	1.301	2.271	10.500
40SJ16	0.0598	0.4781	1.133	0.566	0.187	0.160	1.539	0.626	0.3571	1.115	0.554	0.157	0.150 ^c	0.0006	0.6816	1.374	2.240	13.302
40SJ14	0.0747	0.5918	1.389	0.694	0.227	0.194	1.532	0.619	0.4833	1.366	0.679	0.189	0.181 ^c	0.0011	0.8176	1.359	2.234	16.300
60SJ20	0.0359	0.3540	1.798	0.597	0.122	0.094	2.253	0.587	0.2148	1.787	0.539	0.112	0.008 ^c	0.0002	0.8744	1.111	3.337	12.930
60SJ18	0.0478	0.4686	2.365	0.785	0.158	0.122	2.246	0.581	0.3107	2.350	0.773	0.145	0.118 ^c	0.0004	1.1309	1.099	3.348	18.561
60SJ16	0.0598	0.5977	3.008	0.999	0.214	0.168	2.243	0.598	0.4303	2.990	0.990	0.195	0.163 ^c	0.0007	1.5888	1.163	3.250	23.759
60SJ14	0.0747	0.7412	3.701	1.229	0.259	0.203	2.234	0.591	0.5858	3.679	1.218	0.236	0.197 ^c	0.0014	1.9148	1.148	3.261	29.231
72SJ18	0.0478	0.5284	3.746	1.029	0.167	0.124	2.663	0.562	0.2969	3.732	1.015	0.157	0.118 ^c	0.0004	1.7311	1.005	4.324	24.361
72SJ16	0.0598	0.6725	4.771	1.311	0.225	0.171	2.664	0.579	0.4304	4.753	1.303	0.211	0.166 ^c	0.0008	2.4067	1.064	4.180	31.268
72SJ14	0.0747	0.8346	5.880	1.615	0.273	0.207	2.654	0.572	0.6152	5.857	1.605	0.256	0.203 ^c	0.0015	2.9054	1.050	4.206	35.529
80SJ18	0.0478	0.5642	4.770	1.187	0.171	0.125	2.908	0.550	0.2937	4.756	1.161	0.159	0.118 ^c	0.0004	2.1644	0.956	5.020	27.874
80SJ16	0.0598	0.7173	6.078	1.513	0.231	0.172	2.911	0.568	0.4560	6.059	1.505	0.219	0.166 ^c	0.0009	2.9966	1.013	4.847	36.132
80SJ14	0.0747	0.8906	7.496	1.866	0.280	0.209	2.901	0.561	0.6936	7.473	1.856	0.265	0.205 ^c	0.0017	3.6201	0.999	4.883	44.557
92SJ16	0.0598	0.7921	8.710	1.875	0.240	0.174	3.316	0.550	0.4146	8.691	1.868	0.227	0.166 ^c	0.0009	4.1513	0.938	6.138	44.838
92SJ14	0.0747	0.9840	10.753	2.315	0.290	0.211	3.306	0.543	0.6028	10.730	2.306	0.278	0.206 ^c	0.0018	5.0200	0.925	6.193	55.351
115SJ16	0.0598	0.9266	15.046	2.606	0.251	0.177	4.030	0.521	0.4355	15.030	2.293	0.229	0.166 ^c	0.0011	6.7915	0.830	9.022	55.030
115SJ14	0.0747	1.1521	18.602	3.222	0.304	0.214	4.018	0.514	0.5366	18.580	3.214	0.292	0.207 ^c	0.0021	8.2221	0.818	9.121	77.138
135SJ14	0.0747	1.3015	28.014	4.134	0.313	0.216	4.639	0.491	0.8562	27.990	3.752	0.295	0.207 ^c	0.0024	11.8321	0.743	12.334	90.046

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (40ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination. (4) Based on web in tension (t) or compression (c).

Table 4

CR: Structural Properties⁽¹⁾

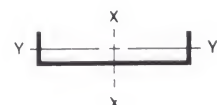
Member	A ⁽²⁾ (in ²)	t ⁽²⁾ (in)	Gross Properties							Effective Properties					Torsional Properties				
			I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	AE ⁽²⁾ (in ²)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y ⁽⁴⁾ (in ³)	J (in ⁴)	C _w (in ⁶)	X _o (in)	j (in)	Ma (k-in)	
362CR20	0.199	0.0329	0.399	0.215	0.029	0.029	1.416	0.379	0.106	0.328	0.160	0.019	0.004 ^t	0.00007	0.0670	0.674	2.106	3.170	
362CR18	0.290	0.0478	0.579	0.311	0.041	0.042	1.417	0.376	0.231	0.548	0.259	0.027	0.014 ^t	0.00022	0.0995	0.670	2.063	5.127	
362CR16	0.362	0.0598	0.730	0.388	0.050	0.052	1.422	0.374	0.314	0.721	0.348	0.050	0.027 ^t	0.00043	0.1244	0.665	2.075	6.897	
362CR14	0.452	0.0747	0.914	0.483	0.062	0.064	1.425	0.371	0.424	0.914	0.464	0.062	0.051 ^t	0.00084	0.1542	0.659	2.084	9.199	
40CR20	0.211	0.0329	0.501	0.246	0.029	0.029	1.541	0.372	0.107	0.415	0.185	0.020	0.004 ^t	0.00008	0.0840	0.645	2.365	3.670	
40CR18	0.308	0.0478	0.728	0.355	0.042	0.042	1.542	0.369	0.233	0.690	0.298	0.028	0.014 ^t	0.00023	0.1249	0.641	2.317	5.906	
40CR16	0.385	0.0598	0.916	0.443	0.052	0.052	1.546	0.367	0.318	0.905	0.400	0.052	0.027 ^t	0.00046	0.1558	0.636	2.332	7.913	
40CR14	0.480	0.0747	1.147	0.551	0.064	0.065	1.549	0.365	0.432	1.147	0.531	0.064	0.052 ^t	0.00089	0.1930	0.630	2.344	10.522	
60CR20	0.277	0.0329	1.320	0.434	0.032	0.031	2.183	0.341	0.111	1.046	0.304	0.022	0.004 ^t	0.00010	0.2170	0.527	4.239	6.020	
60CR18	0.403	0.0478	1.915	0.628	0.046	0.044	2.183	0.338	0.241	1.828	0.546	0.031	0.015 ^t	0.00031	0.3172	0.523	4.174	10.808	
60CR16	0.504	0.0598	2.404	0.784	0.057	0.054	2.186	0.336	0.332	2.377	0.721	0.057	0.029 ^t	0.00060	0.3943	0.519	4.204	14.274	
60CR14	0.630	0.0747	3.006	0.975	0.070	0.067	2.188	0.333	0.459	3.006	0.947	0.070	0.054 ^t	0.00117	0.4871	0.514	4.231	18.749	
725CR18	0.463	0.0478	3.054	0.830	0.048	0.044	2.572	0.321	0.242	2.924	0.733	0.032	0.015 ^t	0.00035	0.4891	0.470	5.757	14.518	
725CR16	0.579	0.0598	3.830	1.037	0.059	0.055	2.575	0.319	0.336	3.788	0.962	0.059	0.029 ^t	0.00069	0.6072	0.466	5.798	19.056	
725CR14	0.723	0.0747	4.786	1.291	0.072	0.068	2.576	0.317	0.468	4.786	1.257	0.072	0.055 ^t	0.00134	0.7494	0.462	5.836	24.895	
80CR18	0.499	0.0478	3.907	0.964	0.048	0.045	2.802	0.312	0.243	3.749	0.858	0.032	0.015 ^t	0.00038	0.6121	0.443	6.862	16.982	
80CR16	0.624	0.0598	4.898	1.204	0.060	0.056	2.805	0.310	0.338	4.843	1.122	0.060	0.029 ^t	0.00074	0.7595	0.440	6.909	22.222	
80CR14	0.779	0.0747	6.120	1.500	0.074	0.069	2.806	0.308	0.471	6.119	1.462	0.074	0.055 ^t	0.00145	0.9368	0.435	6.954	28.953	
925CR18	0.559	0.0478	5.644	1.207	0.050	0.045	3.182	0.298	0.245	5.743	0.955	0.033	0.015 ^t	0.00042	0.8508	0.405	8.960	18.907	
925CR16	0.699	0.0598	7.074	1.507	0.061	0.056	3.185	0.296	0.341	6.998	1.414	0.060	0.030 ^t	0.00083	1.0550	0.401	9.020	27.994	
925CR14	0.872	0.0747	8.836	1.877	0.075	0.069	3.186	0.294	0.477	8.836	1.835	0.075	0.056 ^t	0.00161	1.3004	0.069	9.077	36.333	
115CR16	0.833	0.0598	12.402	2.132	0.063	0.057	3.861	0.275	0.344	12.349	1.816	0.061	0.030 ^t	0.00010	1.7207	0.348	13.629	35.953	
115CR14	1.040	0.0747	15.488	2.656	0.078	0.070	3.862	0.273	0.483	15.488	2.604	0.077	0.056 ^t	0.00193	2.1193	0.344	13.705	51.559	
135CR14	1.190	0.0747	23.595	3.454	0.079	0.071	4.456	0.258	0.487	23.594	3.323	0.077	0.057 ^t	0.00221	3.0276	0.071	18.694	65.803	

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot-dipped per A525). (2) Design thickness without coating. (3) Deflection determination. (4) Based on web in tension (t) or compression (c).

A full unreduced gross cross sectional area away from the hole
 ANET full cross sectional area at hole
 AET effective cross sectional area based on stub column test
 AE effective cross sectional area based on 1986 AISI
 t design thickness (uncoated)
 I_x, I_y moment of inertia of the gross section; and the effective section about the principal axis
 S_x, S_y section modulus of the gross section; and the effective section at yield about the principal axis
 r_x, r_y radius of gyration of the gross cross section away from the hole
 J St. Venant torsion constant
 C_w torsional-warping constant of the cross section
 X_o distance between center of gravity of gross cross section and shear center along the x-x axis
 j section property for torsional-flexural buckling
 M_a allowable bending moment about the x-x axis

SJ

CR





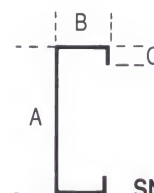
SJ studs are used in both load-bearing and curtain wall applications.

Table 5

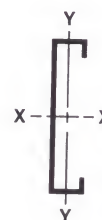
SN: Physical Properties

Member	Dimension			t ⁽¹⁾ (in)	ANET ⁽¹⁾ (in ²)	Weight ⁽²⁾	
	A	B	C			lb/ft	kg/m
358SN20	3.573	1.375	0.438	0.0329	0.177	0.77	1.15
358SN18	3.573	1.375	0.438	0.0438	0.233	1.02	1.52
358SN16	3.573	1.375	0.375	0.0548	0.282	1.24	1.85
358SN14	3.573	1.375	0.375	0.0697	0.354	1.56	2.32
600SN20	5.921	1.375	0.438	0.0329	0.254	1.03	1.54
600SN18	5.921	1.375	0.438	0.0438	0.336	1.37	2.04
600SN16	5.921	1.375	0.375	0.0548	0.411	1.63	2.50
600SN14	5.921	1.375	0.375	0.0697	0.517	2.11	3.15
800SN18	7.921	1.375	0.438	0.0438	0.424	1.44	2.15
800SN16	7.921	1.375	0.375	0.0548	0.520	2.05	3.05
800SN14	7.921	1.375	0.375	0.0697	0.657	2.59	3.86

(1) Design thickness without coating. (2) Average shipping weight excluding coating.



SN physical properties



SN structural properties

Table 6

SN: Structural Properties⁽¹⁾

Member	t ⁽²⁾ (in)	Gross Properties							Effective Properties				Torsional Properties				Ma (k-in)
		A ⁽²⁾ (in ²)	I _x (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	r _x (in)	r _y (in)	I _x ⁽³⁾ (in ⁴)	S _x (in ³)	I _y (in ⁴)	S _y (in ³)	J (in ⁴)	C _w (in ⁶)	X _o (in)	j (in)	
358SN20	0.0329	0.2263	0.446	0.246	0.060	0.063	1.404	0.513	0.446	0.245	0.049	0.059	0.00008	0.1663	1.080	2.033	5.332
358SN18	0.0438	0.2989	0.585	0.323	0.077	0.081	1.400	0.508	0.585	0.320	0.063	0.076	0.00019	0.2138	1.069	2.032	7.138
358SN16	0.0548	0.3641	0.707	0.390	0.088	0.099	1.393	0.491	0.707	0.387	0.072	0.084	0.00036	0.2319	1.015	2.056	8.806
358SN14	0.0697	0.4582	0.879	0.485	0.107	0.121	1.385	0.483	0.879	0.481	0.088	0.103	0.00074	0.2807	1.000	2.058	11.240
600SN20	0.0329	0.3035	1.478	0.493	0.069	0.066	2.207	0.477	1.477	0.496	0.053	0.060	0.00011	0.4958	0.868	3.551	10.795
600SN18	0.0438	0.4017	1.944	0.648	0.089	0.085	2.200	0.472	1.944	0.652	0.076	0.081	0.00026	0.6403	0.858	3.572	14.537
600SN16	0.0548	0.4928	2.358	0.786	0.101	0.103	2.187	0.454	2.357	0.791	0.094	0.093	0.00049	0.7141	0.812	3.689	18.008
600SN14	0.0697	0.6218	2.948	0.983	0.124	0.127	2.178	0.446	2.948	0.989	0.114	0.113	0.00100	0.8698	0.798	3.726	23.120
800SN18	0.0438	0.4893	3.965	0.991	0.096	0.087	2.847	0.443	3.964	0.998	0.077	0.081	0.00031	1.2332	0.738	5.659	22.231
800SN16	0.0548	0.6024	4.823	1.206	0.108	0.106	2.829	0.424	4.821	1.213	0.096	0.093	0.00060	1.3870	0.697	5.881	27.621
800SN14	0.0697	0.7612	6.046	1.512	0.132	0.129	2.818	0.417	6.044	1.521	0.125	0.116	0.00123	1.6935	0.684	5.964	35.559

(1) Conforms to 1986 AISI Design Specifications; ASTM A568; ASTM C645; ASTM A446 (33 ksi); ASTM A525 (hot-dipped), A792 (aluminum-zinc) or A591 (electrolytic zinc thickness equivalent to hot dipped per A525). (2) Design thickness without coating. (3) Deflection determination.

Table 7

ST: Physical Properties

Member	Dimension (in)				$t^{(1)}$ (in)	ANET ⁽²⁾ (in ²)	Weight ⁽³⁾	
	A	B	C	D			lb/ft	kg/m
158ST25	1.625	1.250	1.328	0.328	0.0188	0.085	0.33	0.49
212ST25	2.500	1.250	1.328	0.328	0.0188	0.102	0.38	0.57
358ST25	3.625	1.250	1.328	0.328	0.0188	0.123	0.45	0.67
400ST25	4.000	1.250	1.328	0.328	0.0188	0.130	0.48	0.71
600ST25	6.000	1.250	1.328	0.328	0.0188	0.167	0.61	0.91
158ST22	1.625	1.250	1.328	0.328	0.0284	0.100	0.45	0.67
212ST22	2.500	1.250	1.328	0.328	0.0284	0.103	0.53	0.79
358ST22	3.625	1.250	1.328	0.328	0.0284	0.135	0.64	0.95
400ST22	4.000	1.250	1.328	0.328	0.0284	0.146	0.68	1.01
600ST22	6.000	1.250	1.328	0.328	0.0284	0.203	0.88	1.31
158ST20	1.625	1.250	1.328	0.328	0.0329	0.144	0.56	0.83
212ST20	2.500	1.250	1.328	0.328	0.0329	0.173	0.73	1.09
358ST20	3.625	1.250	1.328	0.328	0.0329	0.210	0.85	1.27
400ST20	4.000	1.250	1.328	0.328	0.0329	0.223	0.90	1.34
600ST20	6.000	1.250	1.328	0.328	0.0329	0.288	1.17	1.74

(1) Design thickness without coating. (2) Excluding coating through section at hole. (3) Average shipping weight including coating.

ST

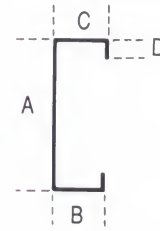


Table 8

ST: Structural Properties⁽¹⁾

Member	$I_x^{(2)}$ (in ⁴)	$S_x^{(2)}$ (in ³)	r_x (in)	$I_y^{(2)}$ (in ⁴)	$S_y^{(2)}$ (in ³)	r_y (in)	Allowable moment (k-in)
158ST25	0.038	0.040	0.678	0.018	0.024	0.484	0.795
212ST25	0.101	0.071	1.012	0.019	0.024	0.480	1.398
358ST25	0.239	0.113	1.415	0.019	0.024	0.464	2.234
400ST25	0.302	0.123	1.545	0.019	0.024	0.459	2.441
600ST25	0.773	0.184	2.209	0.019	0.024	0.427	3.633
212ST22	0.155	0.110	1.008	0.032	0.037	0.475	2.187
358ST22	0.367	0.182	1.410	0.033	0.037	0.460	3.606
400ST22	0.463	0.209	1.539	0.033	0.038	0.454	4.133
600ST22	1.224	0.342	2.202	0.034	0.038	0.422	6.762
212ST20	0.175	0.123	1.006	0.039	0.044	0.473	2.706
358ST20	0.414	0.213	1.407	0.045	0.046	0.458	4.698
400ST20	0.523	0.246	1.536	0.046	0.047	0.452	5.423
600ST20	1.385	0.437	2.199	0.051	0.048	0.420	9.642

(1) Yield strength (F_y) is 33 ksi. Assumes full lateral support. For laterally unbraced structural member, see Section C3.1.2 of the 1986 AISI Design Specifications. (2) Effective properties based on 1986 AISI Design Specifications.

ST



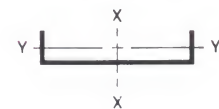
Table 9

CR: Structural Properties⁽¹⁾

Member	$I_x^{(2)}$ (in ⁴)	$S_x^{(2)}$ (in ³)	r_x (in)	Allowable moment (k-in)
158CR25	0.025	0.022	0.663	0.443
212CR25	0.070	0.043	0.992	0.848
358CR25	0.172	0.061	1.366	1.209
400CR25	0.222	0.068	1.488	1.340
600CR25	0.629	0.101	2.115	1.990
212CR22	0.116	0.073	1.035	1.450
358CR22	0.281	0.128	1.417	2.533
400CR22	0.354	0.149	1.541	2.949
600CR22	0.989	0.220	2.185	4.360
212CR20	0.147	0.095	1.007	1.871
358CR20	0.328	0.160	1.416	3.170
400CR20	0.415	0.185	1.541	3.670
600CR20	1.046	0.304	2.185	6.020

(1) Yield strength (F_y) is 33 ksi. Assumes full lateral support. For laterally unbraced structural member, see Section C3.1.2 of the 1986 AISI Design Specifications. (2) Effective properties based on 1986 AISI Design Specifications.

CR



Joist framing is typically constructed using Unimast's SJ members, 6" and deeper. Smaller SJ members can be used for shorter spans and lighter loads. The following tables contain information on Maximum Allowable Clear Spans and

Maximum allowable Uniform Loads for SJ joist members. See "Design Considerations" on page 39 for information on table data calculations. Contact the Unimast Technical Service Department nearest you for additional information.

Table 10

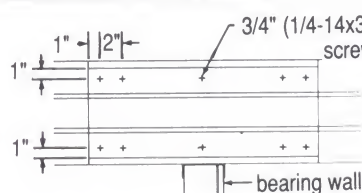
Joists: Maximum Allowable Clear Spans⁽¹⁾

Single and Double-Span

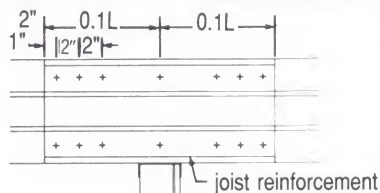
Member ⁽²⁾	Joist spacing (in)	Uniform load (psf)											
		10 dead, 20 live		10 dead, 30 live		10 dead, 40 live		10 dead, 50 live		20 dead, 40 live		20 dead, 100 live	
		1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾	1-span	2-span ⁽³⁾
60SJ20	12	15'9"	17'8"af	13'9"	15'5"bf	12'6"	14'0"bf	11'7"	12'8"bf	12'0"	12'8"bf	8'4"	
	16	14'4"	16'1"bf	12'6"	13'9"bf	11'4"	11'8"bf	10'5"	10'2"cf	10'5"	10'1"cf	6'3"	
	24	12'0"	12'8"bf	10'5"	10'1"cf	9'3"		8'4"		8'4"		4'2"	
60SJ18	12	17'3"	19'4"	15'1"	16'11"	13'8"	15'5"	12'9"	14'3"af	13'8"	15'5"bf	10'1"	11'4"cf
	16	15'8"	17'7"	13'8"	15'5"af	12'5"	14'0"bf	11'7"	13'0"bf	12'5"	14'0"bf	8'10"	
	24	13'8"	15'5"bf	12'0"	13'5"bf	10'10"	12'2"cf	10'1"	11'4"cf	10'2"	12'0"cf	7'2"	
60SJ16	12	18'8"	21'0"	16'4"	18'4"	14'10"	16'8"	13'9"	15'6"	14'10"	16'8"af	10'11"	12'3"bf
	16	17'0"	19'1"	14'10"	16'8"	13'6"	15'2"af	12'6"	14'1"af	13'6"	15'2"af	9'11"	11'2"cf
	24	14'10"	16'8"af	13'0"	14'7"af	11'9"	13'3"bf	10'11"	12'3"bf	11'6"	13'3"bf	8'1"	
60SJ14	12	20'0"	22'6"	17'6"	19'8"	15'11"	17'10"	14'9"	16'7"	15'11"	17'10"	11'9"	13'2"af
	16	18'2"	20'5"	15'11"	17'10"	14'5"	16'3"	13'5"	15'1"	14'5"	16'3"af	10'8"	11'11"bf
	24	15'11"	17'10"	13'11"	15'7"	12'7"	14'2"af	11'9"	13'2"af	12'7"	14'2"af	9'0"	10'5"cf
725SJ18	12	20'2"	22'7"	17'7"	19'9"	16'0"	17'11"	14'10"	16'8"b	16'0"	17'11"b	11'8"	12'7"cf
	16	18'3"	20'6"	16'0"	17'11"b	14'6"	16'4"b	13'6"	15'2"b	14'3"	16'4"bf	10'1"	
	24	16'0"	17'11"b	13'11"	15'8"bf	12'8"	14'3"cf	11'8"	12'7"cf	11'8"	12'7"cf	8'3"	
725SJ16	12	21'10"	24'6"	19'1"	21'5"	17'4"	19'5"	16'1"	18'1"	17'4"	19'5"	12'9"	14'4"bf
	16	19'10"	22'3"	17'4"	19'5"	15'9"	17'8"	14'7"	16'5"b	15'9"	17'8"b	11'5"	13'0"cf
	24	17'4"	19'5"	15'2"	17'0"b	13'9"	15'5"bf	12'9"	14'4"bf	13'2"	15'5"cf	9'4"	
725SJ14	12	23'5"	26'3"	20'5"	22'11"	18'7"	20'10"	17'3"	19'4"	18'7"	20'10"	13'8"	15'4"
	16	21'3"	23'10"	18'7"	20'10"	16'10"	18'11"	15'8"	17'7"	16'10"	18'11"	12'5"	13'11"bf
	24	18'7"	20'10"	16'3"	18'3"	14'9"	16'7"	13'8"	15'4"	14'8"	16'7"b	10'4"	12'1"cf
80SJ18	12	21'10"	24'6"	19'1"	21'5"	17'4"	19'5"b	16'1"	18'1"b	17'4"	19'5"b	12'5"	12'8"d
	16	19'10"	22'3"	17'4"	19'5"b	15'9"	17'8"b	14'7"	16'5"d	15'3"	16'10"d	10'9"	10'0"df
	24	17'4"	19'5"b	15'2"	16'11"d	13'8"	14'5"d	12'5"	12'8"d	12'5"	12'7"d	8'0"	7'1"ef
80SJ16	12	23'8"	26'7"	20'8"	23'2"	18'9"	21'1"	17'5"	19'7"	18'9"	21'1"	13'10"	15'6"df
	16	21'6"	24'2"	18'9"	21'1"	17'1"	19'2"	15'10"	17'9"b	17'1"	19'2"b	12'3"	14'1"df
	24	18'9"	21'1"	16'5"	18'5"b	14'11"	16'9"b	13'10"	15'6"df	14'2"	16'9"df	10'0"	11'1"ef
80SJ14	12	25'4"	28'6"	22'2"	24'11"	20'2"	22'7"	18'8"	21'0"	20'2"	22'7"	14'10"	16'8"b
	16	23'1"	25'11"	20'2"	22'7"	18'4"	20'6"	17'0"	19'1"	18'4"	20'6"	13'6"	15'2"b
	24	20'2"	22'7"	17'7"	19'9"	16'0"	17'11"	14'10"	16'8"b	15'9"	17'11"b	11'2"	12'11"df
925SJ16	12	26'8"	29'11"	23'4"	26'2"	21'2"	23'9"	19'8"	22'1"b	21'2"	23'9"b	15'7"	17'6"d
	16	24'3"	27'3"	21'2"	23'9"	19'3"	21'7"b	17'10"	20'1"b	19'3"	21'7"b	13'8"	15'0"d
	24	21'2"	23'9"b	18'6"	20'9"b	16'10"	18'10"d	15'7"	17'6"d	15'9"	18'3"d	11'2"	12'2"ef
925SJ14	12	28'7"	32'2"	25'0"	28'1"	22'9"	25'6"	21'1"	23'8"	22'9"	25'6"	16'9"	18'10"b
	16	26'0"	29'2"	22'9"	25'6"	20'8"	23'2"	19'2"	21'6"	20'8"	23'2"	15'2"	17'1"b
	24	22'9"	25'6"	19'10"	22'3"	18'0"	20'3"b	16'9"	18'10"b	17'6"	20'3"b	12'5"	14'6"b
115SJ16	12	32'0"	35'11"	28'0"	31'5"	25'5"	28'6"b	23'7"	26'6"b	24'9"	28'6"b	17'6"	18'0"d
	16	29'1"	32'8"	25'5"	28'6"b	23'1"	25'11"b	21'5"	24'1"b	21'5"	24'0"b	15'2"	14'4"d
	24	24'9"	28'6"b	21'5"	24'0"b	19'2"	20'6"	17'6"	18'0"d	17'6"	18'0"d	11'7"	10'2"d
115SJ14	12	34'4"	38'7"	30'0"	33'9"	27'3"	30'8"	25'4"	28'5"	27'3"	30'8"	20'1"	22'7"b
	16	31'3"	35'1"	27'3"	30'8"	24'9"	27'10"	23'0"	25'10"b	24'9"	27'10"b	17'11"	20'6"d
	24	27'3"	30'8"	23'10"	26'9"b	21'8"	24'4"b	20'1"	22'7"b	20'8"	24'4"b	14'8"	16'1"d
135SJ14	12	39'5"	44'3"	34'5"	38'8"	31'3"	35'1"	29'0"	32'7"	31'3"	35'1"	22'4"	25'9"b
	16	35'10"	40'2"	31'3"	35'1"	28'5"	31'11"b	26'5"	29'7"b	27'5"	31'11"b	19'4"	21'2"d
	24	31'3"	35'1"	27'4"	30'8"b	24'6"	27'10"b	22'4"	25'9"b	22'4"	25'10"b	15'10"	15'9"d

(1) Based on allowable design stress or live load deflection limitation of L/360, whichever is less. See Design Considerations, page 39. (2) Allowable clear spans based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. All joists must be checked for web crippling (see Tables 16 and 17). Joists must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required. (3) Joist reinforcing required for a minimum distance of 0.1 span each side, total of 0.2 span, of center support. Screw attachment pattern is "a" unless other pattern is designated. See screw patterns below.

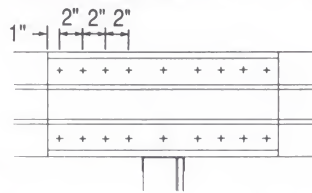
Screw Pattern "a"



Screw Pattern "b"



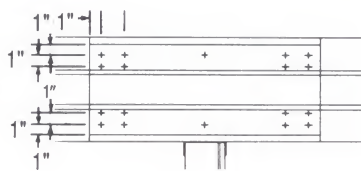
Screw Pattern "c"



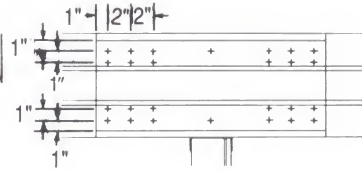
Screw Pattern "f"



Screw Pattern "d"



Screw Pattern "e"





Typical joist reinforcement detail.

Table 11

Joists: Allowable Uniform Loads (lb/ft)⁽¹⁾

Single and Double Span

Member ⁽²⁾	Single span																	
	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
362SJ20	46	32	24	18	14	11												
362SJ18	60	42	31	23	18	14	11											
362SJ16	76	54	39	29	23	18	14	12	10									
362SJ14	93	66	48	36	28	22	17	14	12	10								
40SJ20	57	40	29	22	17	13	11											
40SJ18	75	53	39	29	22	18	14	11										
40SJ16	95	67	49	37	28	22	18	14	12	10								
40SJ14	117	82	60	45	35	27	22	18	15	12	10							
60SJ20	125	106	78	59	45	36	28	23	19	16	13	11	10					
60SJ18	193	141	103	77	59	47	37	30	25	21	18	15	13	11	10			
60SJ16	247	179	131	98	76	59	48	39	32	27	22	19	16	14	12	11		
60SJ14	304	221	161	121	93	73	59	48	39	33	28	23	20	17	15	13	12	10
72SJ18	254	201	162	123	94	74	59	48	40	33	28	24	20	18	15	13	12	10
72SJ16	326	257	208	156	120	95	76	62	51	42	36	30	26	22	20	17	15	13
72SJ14	401	317	256	192	148	117	93	76	62	52	44	37	32	28	24	21	19	16
80SJ18	239	213	186	154	120	95	76	62	51	42	36	30	26	22	20	17	15	13
80SJ16	376	297	241	199	153	121	97	78	65	54	45	39	33	29	25	22	19	17
80SJ14	464	367	297	245	189	149	119	97	80	66	56	48	41	35	31	27	24	21
92SJ16	417	369	299	247	208	173	138	113	93	77	65	55	47	41	36	31	27	24
92SJ14	577	456	369	305	256	213	171	139	114	95	80	68	59	51	44	39	34	30
115SJ16	347	308	277	252	231	213	187	163	143	127	113	96	82	71	62	54	48	42
115SJ14	677	602	514	425	357	304	262	229	198	165	139	118	101	88	76	67	59	52
135SJ14	587	522	470	427	392	355	306	267	234	208	185	166	150	132	115	101	88	78
Member ⁽²⁾	Double span																	
	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
362SJ20	65	46	33	25	19	15	12	10										
362SJ18	86	60	44	33	25	20	16	13	11									
362SJ16	108	76	55	42	32	25	20	16	13	11								
362SJ14	132	93	68	51	39	31	25	20	17	14	12	10						
40SJ20	81	57	42	31	24	19	15	12	10									
40SJ18	107	75	55	41	32	25	20	16	13	11								
40SJ16	135	95	69	52	40	31	25	20	17	14	12	10						
40SJ14	165	116	85	64	49	38	31	25	21	17	14	12	11					
60SJ20	107	93	82	72	64	50	40	33	27	22	19	16	14	12	10			
60SJ18	222	187	145	109	84	66	53	43	35	30	25	21	18	16	14	12	11	9
60SJ16	323	254	185	139	107	84	67	55	45	38	32	27	23	20	17	15	13	12
60SJ14	398	312	228	171	132	104	83	67	56	46	39	33	28	25	21	19	16	15
72SJ18	218	188	164	145	129	105	84	68	56	47	40	34	29	25	22	19	17	15
72SJ16	377	319	272	221	170	134	107	87	72	60	50	43	37	32	28	24	21	19
72SJ14	524	414	335	272	210	165	132	107	88	74	62	53	45	39	34	30	26	23
80SJ18	209	183	161	143	128	115	104	87	72	60	50	43	37	32	28	24	21	19
80SJ16	376	322	279	244	214	171	137	111	92	76	64	55	47	40	35	31	27	24
80SJ14	606	479	388	321	268	210	168	137	113	94	79	67	58	50	43	38	33	30
92SJ16	361	314	276	244	218	196	177	159	131	109	92	78	67	58	50	44	39	34
92SJ14	628	534	459	398	335	285	242	197	162	135	114	97	83	72	62	55	48	42
115SJ16	315	277	246	221	199	181	166	152	140	129	120	112	104	97	87	76	67	59
115SJ14	591	515	453	403	360	324	293	267	243	223	197	168	144	124	108	94	83	74
135SJ14	532	467	415	372	335	305	278	255	235	217	201	187	174	162	152	142	125	111

(1) Based on allowable design stress or total load deflection limitation of L/360, whichever is less. See Design Considerations, page 39. (2) Allowable clear spans based on SJ members with 40 ksi yield strength (F_y). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. All joists must be checked for web crippling (see Tables 16 and 17). Joists must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist stiffeners may be required.

Table 12

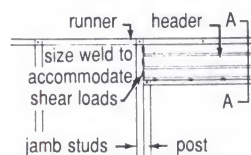
Headers: Allowable Uniform Loads (lb/ft) Boxed Configuration

Span (ft)	60SJ				725SJ		
	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
4	490	1160	1982	2438	1013	1989	3187
6	327	656	881	1083	676	1108	1416
8	245	369	495	609	456	623	797
10	156	205	261	322	292	399	510
12	90	119	151	186	189	240	295
14	57	75	95	117	119	151	186

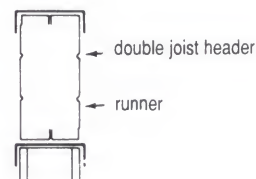
Span (ft)	80SJ			925SJ		115SJ		135SJ
	18 gauge	16 gauge	14 gauge	16 gauge	14 gauge	16 gauge	14 gauge	14 gauge
4	940	1844	3606	1642	3209	1367	2671	2321
6	627	1230	1628	1095	1949	911	1780	1547
8	470	700	916	821	1096	684	1335	1160
10	324	448	586	529	702	547	911	928
12	225	307	378	367	487	456	633	759
14	152	193	238	270	342	341	465	558

Uniform load values are for headers made of two boxed unpunched SJ sections, with stiffened end conditions, as shown. Maximum total load deflection is limited to $L/360$. Header sections must be checked for web crippling under concentrated loads and at end supports (see Tables 16 and 17).

Header detail



(Section A-A)



Floor Bridging

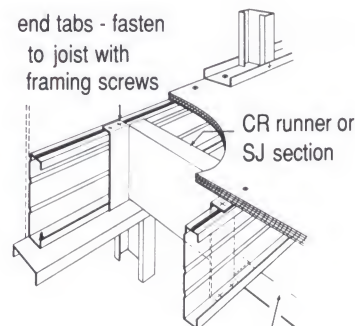
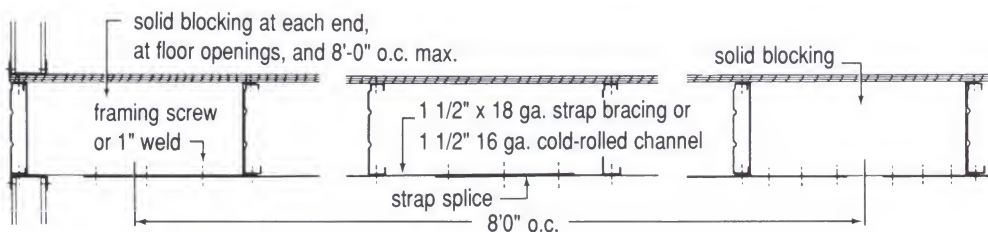
Install bridging immediately after joists are erected and before construction loads are applied to prevent flange rotation and to support flanges in compression.

Lateral support is provided by subfloor or deck material on the top flanges. Bridging consisting of solid blocking and strap bracing or $1\frac{1}{2}$ " cold-rolled channels screw-attached or welded to bottom joist flanges. Spacing of bridging must be calculated based on actual stress.

Solid blocking, a field-cut CR runner or SJ joist section, is welded or screw-attached between outer joists, over all interior supports and adjacent to openings at max. 8' o.c. Cold-rolled channels or strap bracing of $1\frac{1}{2}$ " x 18-gauge corrosion-resistant steel is screw-attached to bottom joist flange between solid blocking.

Where sub-floors or decking do not provide lateral support, joists must be braced at all bearing points and at intervals within spans. For joists in

continuous span conditions, portions of the bottom flanges are in compression and must be laterally braced, based on design requirements.



$1\frac{1}{2}$ " x 18 ga. strap bracing or $1\frac{1}{2}$ " 16 ga. cold-rolled channel - fasten to CR runner blocking with 3 equally-spaced framing screws

Table 13

Joist End Clip: Maximum Allowable Load

Clip length (in)	No. of screws (each leg)	Allowable load (lb/clip)
6	3	560
8	4	890
10	5	980

Allowable loads based on Unimast 2" x 2" 14 gauge end clips attached with 1/2" Type S-12 screws of quantity shown into SJ member of .0359" thickness and 40 ksi yield strength (F_y).

Joist end clip

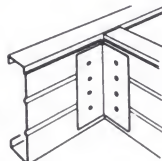


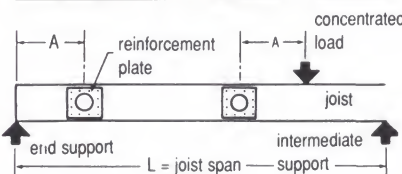
Table 14

Pipe Opening: Maximum Pipe Opening and Web Reinforcement

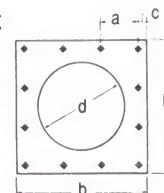
Joists size	"d" max. hole dia. (in)	"b" plate size (in)	"a" hole spacing (in)	"c" end dist. (in)	"A" min. distance to concentrated load or support (1'0" min.)
115SJ	6 $\frac{7}{8}$	9	2 $\frac{1}{2}$	9 $\frac{1}{8}$	L/6
925SJ	5 $\frac{1}{2}$	9	2 $\frac{3}{8}$	1 $\frac{5}{16}$	L/25
80SJ	4 $\frac{1}{4}$	7	1 $\frac{7}{8}$	1 $\frac{1}{16}$	L/16
725SJ	4 $\frac{1}{4}$	7	1 $\frac{7}{8}$	1 $\frac{1}{16}$	L/16
60SJ	3 $\frac{1}{2}$	5 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{32}$	L/10

Plate thickness is 14 gauge (.0710" minimum thickness).

Pipe opening reinforcement



Reinforcement plate



Web stiffeners provide added reinforcement for SJ and SN members under concentrated loads at reactions points of bearing. Web stiffeners increase load carrying capacity by preventing web crippling. Based on 1986 AISI Design Specifications, web stiffening is required for joists under certain critical load conditions (Tables 16 and 17). Stiffeners also are required at points of reaction or concentrated load when the center of a web punchout is less than 10" from the edge of bearing.

The Unimast Web Stiffener consists of two identical steel sections which, when mated and screw-attached to the joist web, enable Unimast steel joists to carry greater loads (Table 15).

In a continuous span condition, joists properly screw-attached back-to-back provide resistance to web crippling loads as shown in Table 17.

Table 15

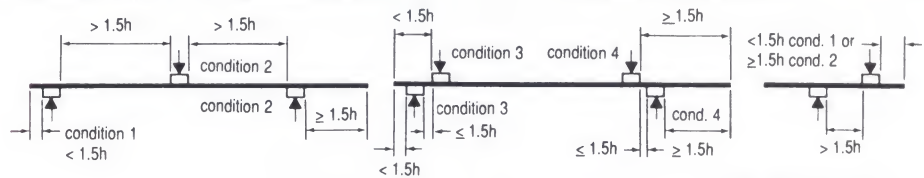
**Web Crippling:
Maximum Allowable Loads⁽¹⁾
Joist Web Stiffener**

Joist style & gauge	Allowable load ⁽¹⁾ (lb/2 piece web stiffener)
SJ14	9000
SJ16	8500
SJ18, 20	7000



Web stiffening provides added reinforcement for SJ and SN members.

Concentrated Loads



Uniform Load

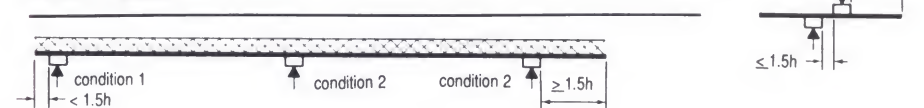


Table 16

Web Crippling: Maximum Allowable Loads (lbs)

Single Joist

Member	Inside depth "h" (in)	Condition 1				Condition 2				Condition 3				Condition 4			
		1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"
135SJ14	13.272	850	1069	1118	1312	1560	1854	1919	2281	543	683	714	839	1299	1349	1360	1404
115SJ14	11.272	912	1147	1200	1409	1636	1944	2013	2392	602	757	791	929	1511	1569	1581	1633
115SJ16	11.301	520	681	717	861	985	1212	1277	1593	327	429	452	542	764	801	809	841
925SJ14	9.022	982	1236	1292	1517	1721	2046	2118	2517	667	840	878	1031	1749	1816	1831	1891
925SJ16	9.051	575	754	794	953	1054	1296	1366	1705	379	497	523	628	952	998	1008	1048
80SJ14	7.772	1021	1285	1343	1577	1769	2102	2177	2586	704	886	926	1088	1881	1954	1970	2034
80SJ16	7.801	606	794	836	1004	1092	1343	1416	1767	408	535	563	676	1057	1107	1118	1163
80SJ18	7.825	347	477	506	621	664	872	937	1195	226	310	329	404	559	592	599	629
725SJ14	7.022	1044	1314	1374	1613	1797	2136	2212	2628	726	913	955	1122	1961	2036	2053	2120
725SJ16	7.051	624	818	862	1034	1115	1372	1446	1804	425	558	587	705	1120	1173	1185	1232
725SJ18	7.075	362	496	526	646	682	897	963	1228	239	328	348	428	608	644	652	684
60SJ14	5.772	1083	1363	1425	1674	1845	2193	2270	2697	763	959	1003	1178	2093	2174	2191	2263
60SJ16	5.801	665	859	904	1085	1154	1419	1495	1886	454	595	627	753	1224	1282	1295	1347
60SJ18	5.825	386	529	561	689	713	937	1007	1284	262	359	381	468	690	731	740	776
60SJ20	5.849	186	272	291	368	378	553	600	786	121	177	190	239	307	331	336	357

Table 17

Web Crippling: Maximum Allowable Loads (lbs)

Joists Back-To-Back

Member	Inside depth "h" (in)	Condition 1				Condition 2				Condition 3				Condition 4			
		1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"	1 1/4"	3 1/2"	4"	6"
135SJ14	13.272	4059	4989	5148	5703	4077	5368	5590	6361	2051	2520	2601	2881	4213	5547	5777	6574
115SJ14	11.272	4059	4989	5148	5703	4077	5368	5590	6361	2133	2621	2705	2997	4416	5816	6056	6891
115SJ16	11.301	2705	3371	3485	3883	2844	3798	3962	4531	1257	1566	1619	1804	2705	3613	3769	4311
925SJ14	9.022	3927	4827	4981	5518	4077	5368	5590	6361	2225	2734	2822	3126	4645	6117	6370	7249
925SJ16	9.051	2705	3371	3485	3883	2844	3798	3962	4531	1328	1655	1711	1907	2893	3863	4030	4610
80SJ14	7.772	3852	4734	4885	5412	4077	5368	5590	6361	2276	2797	2887	3198	4773	6285	6544	7448
80SJ16	7.801	2647	3298	3410	3799	2844	3798	3962	4531	1368	1705	1763	1964	2997	4003	4175	4776
80SJ18	7.825	1803	2279	2361	2645	1971	2670	2790	3207	821	1038	1075	1204	1867	2528	2642	3037
725SJ14	7.022	3806	4678	4828	5348	4077	5368	5590	6361	2307	2835	2926	3241	4849	6386	6649	7567
725SJ16	7.051	2609	3251	3361	3744	2844	3798	3962	4531	1392	1735	1794	1998	3059	4086	4262	4875
725SJ18	7.075	1799	2274	2356	2639	1971	2670	2790	3207	840	1062	1100	1232	1918	2598	2715	3121
60SJ14	5.772	3731	4585	4732	5242	4077	5368	5590	6361	2358	2898	2991	3313	4976	6553	6824	7765
60SJ16	5.801	2546	3173	3280	3654	2844	3798	3962	4531	1432	1784	1845	2055	3164	4225	4408	5042
60SJ18	5.825	1747	2208	2287	2562	1971	2670	2790	3207	871	1101	1141	1278	2004	2715	2837	3261
60SJ20	5.849	1079	1388	1441	1626	1231	1696	1776	2054	463	596	618	698	1110	1530	1602	1853

Allowable loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Allowable loads for conditions shown in details are for web crippling only and apply to joists with solid web at reaction points. See AISI 1986 Design Specifications, Section C3.4 and C3.5, for calculating maximum allowable combined bending and web crippling loads and Section D1.1 for connections to achieve these loads. SJ members must have 10" of unpunched steel at end supports. When field cuts reduce this minimum, joist web stiffeners may be required.

Unimast SJ members are used in joist applications and also in load-bearing wall and curtain wall applications. (Tall walls are not addressed in this literature. Contact the Unimast Technical Department nearest you for further information.)

Axial load bearing studs are designed to carry both vertical loads and lateral loads. Unimast manufactures the SJ stud for use in axial load bearing conditions. *The ST members are not designed to carry axial loads.* The following tables contain allowable axial loads for specific heights and conditions

based on AISI Specifications. See "Design Considerations" on page 39 for information on table data calculations. Contact the Unimast Technical Service Department nearest you for additional information.

Table 18 contains allowable axial construction loads with no wind or lateral loads. This condition occurs during construction prior to the application of sheathing and finish materials. Tables 19-25 contain allowable axial loads for various lateral loadings; 5 psf, 15 psf, 20 psf, 25 psf, 30 psf, 35 psf and 40 psf.

Table 18

0 psf

SJ (3 5/8", 4")



SJ Studs: Allowable Axial Loads (lbs)

Height (ft)	Bracing	362 SJ (3 5/8")				40 SJ (4")			
		20	18	16	14	20	18	16	14
8	none	977	1338	1904	2497	890	1368	2177	3044
	mid-pt	2758	3522	4498	5325	2479	3576	5112	6970
	1/3 pt	3388	4298	5327	6240	2970	4265	5946	8042
9	none	795	1109	1596	1973	722	1129	1816	2405
	mid-pt	2322	2985	3887	4645	2155	3124	4532	6223
	1/3 pt	3108	3943	4901	5744	2769	3976	5124	7518
10	none	665	945	1374	1598	602	957	1472	1948
	mid-pt	1898	2455	3240	3922	1800	2630	3901	5420
	1/3 pt	2797	3550	4429	5197	2544	3655	5124	6939
11	none	568	823	1152	1321	513	830	1216	1610
	mid-pt	1581	2056	2721	3316	1498	2200	3281	4607
	1/3 pt	2454	3118	3911	4599	2298	3303	4650	6307
12	none	495	730	968	1110	445	704	1022	1353
	mid-pt	1339	1752	2325	2853	1268	1873	2801	3961
	1/3 pt	2089	2659	3354	3956	2028	2920	4135	5623
14	none	392	553	711	815	350	518	751	994
	mid-pt	1022	1326	1770	2201	948	1415	2130	3053
	1/3 pt	1542	1971	2490	2952	1509	2181	3108	4251
16	none	783	1049	1407	1770	739	1117	1691	2455
	mid-pt	1188	1524	1929	2297	1162	1685	2406	3307
18	none	632	857	1155	1467	596	912	1388	2037
	mid-pt	945	1217	1543	1846	923	1345	1924	2657
20	none	524	719	973	1244	494	764	1169	1730
	mid-pt	770	997	1266	1521	753	1101	1578	2188

SJ (6", 7 1/4", 8")



Height (ft)	Bracing	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20	18	16	14	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	none	1219	1728	2531	3364	1542	2374	3310	1464	2420	3589
	mid-pt	3448	4957	6980	9437	4634	6850	9715	4520	7169	10813
	1/3 pt	3961	5725	7972	10846	5496	8026	11438	5408	8464	12834
9	none	963	1365	2000	2658	1218	1876	2616	1156	1912	2835
	mid-pt	3175	4555	6453	8702	4222	6288	8891	4095	6550	9847
	1/3 pt	3825	5529	7712	10494	5313	7776	11072	5219	8189	12404
10	none	780	1106	1620	2153	987	1519	2119	937	1549	2297
	mid-pt	2870	4105	5864	7880	3762	5659	7971	3621	5857	8768
	1/3 pt	3674	5310	7424	10104	5108	7497	10663	5009	7881	11925
11	none	645	914	1339	1779	815	1256	1751	774	1280	1898
	mid-pt	2533	3608	5212	6972	3253	4965	6953	3096	5092	7575
	1/3 pt	3508	5070	7107	9678	4882	7188	10211	4775	7541	11394
12	none	542	768	1125	1495	685	1055	1471	651	1075	1595
	mid-pt	2166	3072	4499	5980	2741	4221	5885	2602	4301	6380
	1/3 pt	3326	4809	6763	9217	4634	6850	9715	4520	7169	10813
14	none	398	564	826	1098	503	775	1081	490	790	1172
	mid-pt	1592	2257	3305	4394	2013	3101	4324	1912	3160	4687
	1/3 pt	2917	4223	5995	8196	4074	6086	8595	3943	6327	9500
16	none	1219	1728	2531	3364	1542	2374	3310	1464	2420	3589
	mid-pt	2249	3558	5126	7050	3428	5204	7303	3277	5356	7985
18	none	963	1365	2000	2658	1218	1876	2616	1156	1912	2835
	mid-pt	1962	2864	4182	5805	2741	4221	5885	2602	4301	6380
20	none	780	1106	1620	2153	987	1519	2119	937	1549	2297
	mid-pt	1598	2343	3429	4787	2220	3419	4767	2108	3484	5167

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Allowable axial loads based on various bracing conditions: none--studs unbraced; mid-pt -- mechanical bracing at the mid-point of the stud clear height; 1/3 pt -- mechanical bracing at third points of stud clear height. See Design Considerations, page 39.

Steel framing speeds construction
for both exterior walls and
interior partitions.

Table 19

5 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Interior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	3143	4015	5164	6118	2722	3929	5650	7708
	16	3143	4015	5164	6118	2722	3929	5650	7708
	24	3143	4015	5164	6118	2722	3929	5650	7708
9	12	3142	4014	5163	6117	2722	3929	5649	7707
	16	3142	4014	5163	6117	2722	3929	5649	7707
	24	2911	4014	5163	6117	2722	3929	5649	7707
10	12	3142	4013	5162	6116	2722	3928	5648	7706
	16	2928	4013	5162	6116	2722	3928	5648	7706
	24	2528	3617	4978	6116	2530	3906	5648	7706
11	12	2816	3900	5160	6114	2721	3927	5647	7705
	16	2564	3620	4929	6114	2606	3927	5647	7705
	24	2141	3147	4395	5589	2244	3517	5257	7268
12	12	2458	3456	4673	5857	2571	3866	5589	7523
	16	2203	3168	4349	5501	2341	3583	5240	7107
	24	1776*	2686	3805	4905	1947	3103	4651	6409
14	12	1815	2615	3569	4534	2048	3095	4410	5831
	16	1574*	2345	3272	4208	1801	2800	4071	5457
	24	1163†	1884*	2762	3648	1385*	2304	3495	4811
16	12	1319*	1953*	2698	3463	1567*	2392	3395	4466
	16	1095†	1705*	2431*	3174	1326*	2114*	3090	4139
	24	705†	1274†	1961*	2664*	919†	1639*	2557*	3557*
18	12	951†	1459*	2051*	2663	1176*	1831*	2618	3452
	16	740†	1229*	1807*	2401*	946†	1573*	2339*	3157*
	24	368†	821†	1367†	1928†	554†	1123†	1843†	2621*
20	12	677†	1090†	1571†	2069*	870†	1400†	2031*	2700*
	16	475†	872†	1341†	1824†	651†	1156†	1772†	2426*
	24	116 +	481 +	924†	1377†	272 +	727†	1303†	1922†

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
10	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
11	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
12	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
14	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3132	4875	6979	9436	4634	6849	9715	4520	7168	10813
16	12	3400	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3110	4780	6974	9436	4634	6849	9715	4520	7168	10813
	24	2602	4167	6231	8649	4634	6849	9715	4520	7168	10813
18	12	2947	4487	6459	8699	4634	6849	9715	4520	7168	10813
	16	2620	4091	5985	8144	4634	6849	9715	4520	7168	10813
	24	2066	3424	5189	7213	4247	6634	9603	4520	7168	10813
20	12	2478	3805	5462	7297	4634	6849	9715	4520	7168	10813
	16	2140	3403	4997	6775	4332	6637	9439	4520	7168	10813
	24	1572*	2728*	4212	5883	3695	5836	8434	4088	6790	10293

SJ (6", 7 1/4", 8")

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 20

15 psf

SJ Studs: Allowable Axial Loads

Exterior Wall

Height (ft.)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2873	4015	5164	6118	2722	3929	5650	7708
	16	2527	3669	5106	6118	2462	3883	5650	7708
	24	1910	3013	4395	5659	1971	3307	5198	7455
9	12	2457	3569	4967	6117	2436	3826	5649	7707
	16	2059	3139	4492	5743	2114	3443	5310	7525
	24	1372*	2388	3661	4866	1536	2755	4472	6512
10	12	2028	3066	4363	5583	2115	3406	5200	7306
	16	1601*	2592	3832	5015	1747	2963	4655	6645
	24	877*	1786*	2928	4041	1104*	2189	3712	5509
11	12	1620*	2563	3737	4875	1782	2956	4566	6432
	16	1180*	2070*	3181	4269	1382*	2472	3975	5723
	24	442†	1239*	2244*	3247*	698†	1647*	2974	4527
12	12	1252*	2095*	3140	4174	1456*	2507	3929	5554
	16	810†	1597*	2578*	3558	1038*	2002*	3318	4833
	24		761†	1636†	2525*	332†	1149†	2293*	3624*
14	12	653†	1312†	2124*	2948*	877†	1696*	2782*	3999
	16	220†	824†	1580†	2351*	448†	1182†	2178*	3305*
	24			659†	1340†		321†	1161†	2129†
16	12	214†	727†	1360†	2009†	417†	1049†	1882†	2805*
	16		256†	839†	1440†		547†	1302†	2148†
	24				466†			313†	1019†
18	12		295 +	795†	1310†		554†	1203†	1915†
	16			294 +	765†			644†	1290†
	24								202†
20	12			373 +	786†		177 +	689†	1249†
	16				260 +			149 +	648†
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3177	4957	6979	9436	4634	6849	9715	4520	7168	10813
10	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3368	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2817	4603	6979	9436	4634	6849	9715	4520	7168	10813
11	12	3423	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3076	4880	6979	9436	4634	6849	9715	4520	7168	10813
	24	2427	4133	6436	9208	4541	6849	9715	4520	7168	10813
12	12	3161	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2757	4489	6817	9436	4634	6849	9715	4520	7168	10813
	24	2020	3629	5807	8420	4198	6767	9715	4410	7168	10813
14	12	2573	4212	6403	9013	4634	6849	9715	4520	7168	10813
	16	2076	3621	5697	8167	4249	6780	9715	4474	7168	10813
	24	1205*	2585	4463	6698	3427	5782	8768	3773	6620	10495
16	12	1959	3394	5301	7536	4140	6583	9664	4407	7168	10813
	16	1405*	2730	4506	6591	3587	5902	8811	3933	6762	10574
	24	461†	1599*	3159*	4997	2594	4682	7298	3054	5613	9055
18	12	1382*	2603*	4214	6071	3523	5731	8466	3903	6641	10273
	16	803†	1909*	3391*	5109	2882	4937	7479	3329	5882	9262
	24		744†	2011*	3494*	1765*	3564	5786	2297	4533	7495
20	12	878†	1901*	3246*	4775*	2886	4831	7191	3352	5806	8985
	16	292†	1204†	2428*	3833*	2188*	3971	6138	2697	4946	7861
	24			1054†	2242†	997†	2513*	4363*	1552*	3460*	5948

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; for * L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

Table 21

20 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2527	3669	5106	6118	2462	3883	5650	7708
	16	2106	3223	4623	5895	2129	3493	5422	7708
	24	1365*	2427	3755	4993	1520	2777	4561	6692
9	12	2059	3139	4492	5743	2114	3443	5310	7525
	16	1588	2625	3924	5144	1720	2975	4739	6834
	24	781*	1737*	2937	4094	1021*	2141	3728	5618
10	12	1601*	2592	3832	5015	1747	2963	4655	6645
	16	1103*	2038*	3211	4347	1307*	2434	4009	5866
	24	262†	1099*	2156*	3206	545†	1518*	2899	4535
11	12	1180*	2070*	3181	4269	1382*	2472	3975	5723
	16	672†	1498*	2536*	3566	913*	1905*	3287	4901
	24		538†	1454†	2384*	113†	942†	2123*	3516*
12	12	810†	1597*	2578*	3558	1038*	2002*	3318	4833
	16	300†	1022†	1930*	2847*	552†	1415*	2613*	4001
	24			842†	1654†		429†	1429†	2604*
14	12	220†	824†	1580†	2351*	448†	1182†	2178*	3305*
	16		259†	947†	1656†		590†	1478†	2497*
	24				483†			300†	1129†
16	12		256†	839†	1440†		547†	1302†	2148†
	16			227†	772†			623†	1374†
	24								
18	12			294 +	765†			644†	1290†
	16				119 +				545†
	24								
20	12				260 +			149 +	648†
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3325	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
10	12	3368	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2997	4807	6979	9436	4634	6849	9715	4520	7168	10813
	24	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
11	12	3076	4880	6979	9436	4634	6849	9715	4520	7168	10813
	16	2637	4375	6718	9436	4634	6849	9715	4520	7168	10813
	24	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
12	12	2757	4489	6817	9436	4634	6849	9715	4520	7168	10813
	16	2256	3905	6132	8805	4402	6849	9715	4520	7168	10813
	24	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
14	12	2076	3621	5697	8167	4249	6780	9715	4474	7168	10813
	16	1480*	2913	4853	7161	3693	6105	9166	4002	6916	10813
	24	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
16	12	1405*	2730	4506	6591	3587	5902	8811	3933	6762	10574
	16	757†	1953*	3580	5494	2911	5071	7779	3338	5983	9542
	24		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
18	12	803†	1909*	3391*	5109	2882	4937	7479	3329	5882	9262
	16	133†	1107†	2441*	3997*	2118*	3996	6317	2627	4962	8053
	24			848†	2132†	796†	2378*	4335*	1378*	3344	5958
20	12	292†	1204†	2428*	3833*	2188*	3971	6138	2697	4946	7861
	16		398†	1483†	2739†	1370*	2969*	4917	1914*	3927	6547
	24				894†		1275†	2862*	556†	2180*	4318*

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; *for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

SJ (6", 7 1/4", 8")

SJ (3 5/8", 4")



Table 22

25 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	2208	3331	4740	6015	2210	3588	5537	7708
	16	1722	2811	4175	5431	1816	3126	4980	7193
	24	871*	1891	3167	4376	1101	2284	3968	5984
9	12	1701	2748	4061	5288	1816	3088	4877	7001
	16	1167*	2162	3410	4599	1358	2543	4215	6203
	24	254†	1153*	2286*	3397	552*	1581*	3052	4809
10	12	1221*	2170	3359	4506	1412*	2560	4164	6052
	16	662†	1546	2659	3750	910*	1956	3429	5170
	24		491†	1472*	2463*		916*	2172*	3667
11	12	793†	1634*	2689*	3733	1025*	2040*	3451	5096
	16	224†	994†	1968*	2946*	494†	1401*	2677*	4174
	24			756†	1621†		317†	1370*	2624*
12	12	421†	1158†	2084*	3016*	688†	1555*	2780*	4198
	16		515†	1359†	2221*	123†	898†	1991*	3267*
	24			143†	887†			666†	1706†
14	12		393†	1097†	1821†		730†	1644†	2689*
	16			386†	1041†			860†	1780†
	24								244†
16	12			373†	931†		102†	784†	1559†
	16				175†				682†
	24								
18	12				274 +			143 +	724†
	16								
	24								
20	12								
	16								
	24								

SJ (6", 7 1/4", 8")



Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (6")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3380	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2811	4629	6979	9436	4634	6849	9715	4520	7168	10813
9	12	3400	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3030	4861	6979	9436	4634	6849	9715	4520	7168	10813
	24	2326	4065	6417	9254	4448	6849	9715	4520	7168	10813
10	12	3088	4911	6979	9436	4634	6849	9715	4520	7168	10813
	16	2641	4402	6777	9436	4634	6849	9715	4520	7168	10813
	24	1806	3446	5674	8358	4017	6592	9715	4241	7168	10813
11	12	2744	4499	6861	9436	4634	6849	9715	4520	7168	10813
	16	2223	3897	6161	8885	4370	6849	9715	4520	7168	10813
	24	1272	2793	4874	7375	3543	6011	9163	3847	6792	10813
12	12	2378	4047	6298	9002	4505	6849	9715	4520	7168	10813
	16	1791	3361	5492	8048	3996	6527	9715	4240	7168	10813
	24	743*	2132	4046	6342	3035	5376	8357	3418	6222	10067
14	12	1623*	3082	5055	7402	3829	6270	9370	4118	7066	10813
	16	942*	2272*	4091	6257	3168	5468	8380	3548	6329	10114
	24		873*	2430*	4291	1963	4007	6587	2480	4956	8325
16	12	911*	2138*	3800	5755	3075	5271	8027	3483	6172	9792
	16	181†	1263*	2759*	4525*	2288	4308	6837	2778	5254	8585
	24		1003†	2456*		901*	2616*	4760	1498*	3601	6440
18	12	292†	1297†	2667*	4260*	2301*	4221	6594	2797	5183	8343
	16		400†	1604†	3017*	1429*	3152*	5280	1980*	4122	6961
	24			932†			1320*	3046*	541*	2268*	4580
20	12		589†	1707†	2998*	1565*	3207*	5206	2102*	4170	6859
	16			649†	1771†	642†	2081*	3838*	1206*	3014*	5379
	24							1537†		1039†	2875*

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; for * L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

Table 23

30 psf

SJ (3 5/8", 4")

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1910	3013	4395	5659	1971	3307	5198	7455
	16	1365*	2427	3755	4993	1520	2777	4561	6692
	24	417*	1395*	2621	3800	709*	1820	3411	5320
9	12	1372*	2388	3661	4866	1536	2755	4472	6512
	16	781*	1737*	2937	4094	1021*	2141	3728	5618
	24		620*	1690*	2757*	119†	1064*	2429	4065
10	12	877*	1786*	2928	4041	1104*	2189	3712	5509
	16	262†	1099*	2156*	3206	545†	1518*	2899	4535
	24			851†	1788*		367†	1509*	2878*
11	12	442†	1239*	2244*	3247*	698†	1647*	2974	4527
	16		538†	1454†	2384*	113†	942†	2123*	3516*
	24			125†	931†			688†	1816*
12	12		761†	1636†	2525*	332†	1149†	2293*	3624*
	16			842†	1654†		429†	1429†	2604*
	24				193†				894†
14	12			659†	1340†		321†	1161†	2129†
	16				483†			300†	1129†
	24								
16	12				466†			313†	1019†
	16								
	24								
18	12								202†
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3447	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
	24	2480	4258	6660	9436	4568	6849	9715	4520	7168	10813
9	12	3177	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
	24	1923	3608	5894	8649	4117	6727	9715	4319	7168	10813
10	12	2817	4603	6979	9436	4634	6849	9715	4520	7168	10813
	16	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
	24	1337	2906	5050	7631	3614	6117	9320	3900	6879	10813
11	12	2427	4133	6436	9208	4541	6849	9715	4520	7168	10813
	16	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
	24	747*	2182	4160	6538	3067	5445	8478	3439	6276	10175
12	12	2020	3629	5807	8420	4198	6767	9715	4410	7168	10813
	16	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
	24	175*	1464*	3259	5415	2489	4723	7562	2942	5618	9287
14	12	1205*	2585	4463	6698	3427	5782	8768	3773	6620	10495
	16	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
	24		132†	1551*	3253*	1298*	3203	5603	1879	4185	7328
16	12	461†	1599*	3159*	4997	2594	4682	7298	3054	5613	9055
	16		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
	24				1377†	155†	1709*	3652*	795*	2699	5279
18	12		744†	2011*	3494*	1765*	3564	5786	2297	4533	7495
	16			848†	2132†	796†	2378*	4335*	1378*	3344	5958
	24						354†	1873*		1279*	3320*
20	12			1054†	2242†	997†	2513*	4363*	1552*	3460*	5948
	16				894†		1275†	2862*	556†	2180*	4318*
	24							339†			1565†

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

SJ (6", 7 1/4", 8")

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 24

35 psf

SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1630	2713	4068	5319	1741	3037	4873	7066
	16	1031*	2065	3358	4577	1238	2444	4161	6214
	24		931*	2108	3256	338*	1381*	2885	4694
9	12	1067*	2052	3288	4469	1271	2440	4090	6053
	16	424†	1341*	2496	3623	704*	1762	3271	5071
	24		125†	1137*	2161*		581*	1847*	3372
10	12	559†	1431*	2529*	3610	816*	1843*	3293	5006
	16		686†	1692*	2702*	206†	1111*	2406*	3947
	24			279†	1164†			896*	2150*
11	12		876†	1835*	2800*	396†	1283*	2534*	4004
	16	119†	118†	980†	1866*		518†	1612*	2910*
	24				296†				1072†
12	12		396†	1225†	2074*		776†	1845*	3096*
	16			368†	1134†			911†	1995†
	24								148†
14	12			254†	897†			715†	1611†
	16								529†
	24								
16	12								518†
	16								
	24								
18	12								
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3322	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2923	4754	6979	9436	4634	6849	9715	4520	7168	10813
	24	2157	3895	6249	9087	4308	6849	9715	4473	7168	10813
9	12	2958	4779	6979	9436	4634	6849	9715	4520	7168	10813
	16	2463	4220	6595	9436	4559	6849	9715	4520	7168	10813
	24	1533	3164	5386	8062	3791	6345	9617	4044	7076	10813
10	12	2554	4303	6663	9436	4634	6849	9715	4520	7168	10813
	16	1967	3631	5888	8607	4153	6753	9715	4356	7168	10813
	24	888	2388	4451	6932	3219	5652	8760	3564	6456	10438
11	12	2123	3781	6026	8727	4285	6849	9715	4475	7168	10813
	16	1454	3005	5121	7665	3705	6203	9396	3985	6967	10813
	24	251*	1602	3482	5742	2605	4895	7813	3039	5770	9526
12	12	1679	3231	5338	7867	3897	6408	9614	4156	7164	10813
	16	942*	2365	4321	6666	3222	5600	8629	3579	6428	10333
	24		836*	2520	4544	1963	4093	6797	2480	5030	8530
14	12	814*	2121*	3911	6043	3041	5314	8191	3437	6186	9927
	16		1135*	2740*	4657	2193	4286	6929	2687	5221	8669
	24			737†	2293*	669*	2441	4674	1303	3448	6379
16	12		1102†	2567*	4298*	2139	4126	6613	2642	5079	8356
	16			1328†	2839*	1162*	2934	5149	1742	3916	6845
	24			385†			862*	2621*	131*	1850*	4192
18	12		234†	1409†	2788*	1266*	2952*	5036	1826*	3922	6703
	16			152†	1317†	207†	1661*	3461*	812*	2616*	5025
	24							790†		358†	2152*
20	12			454†	1544†	471†	1873*	3586*	1039*	2799*	5105
	16						532†	1963†		1407*	3339*
	24										358†

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; for * L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.

Table 25

40 psf

SJ (3 5/8", 4")

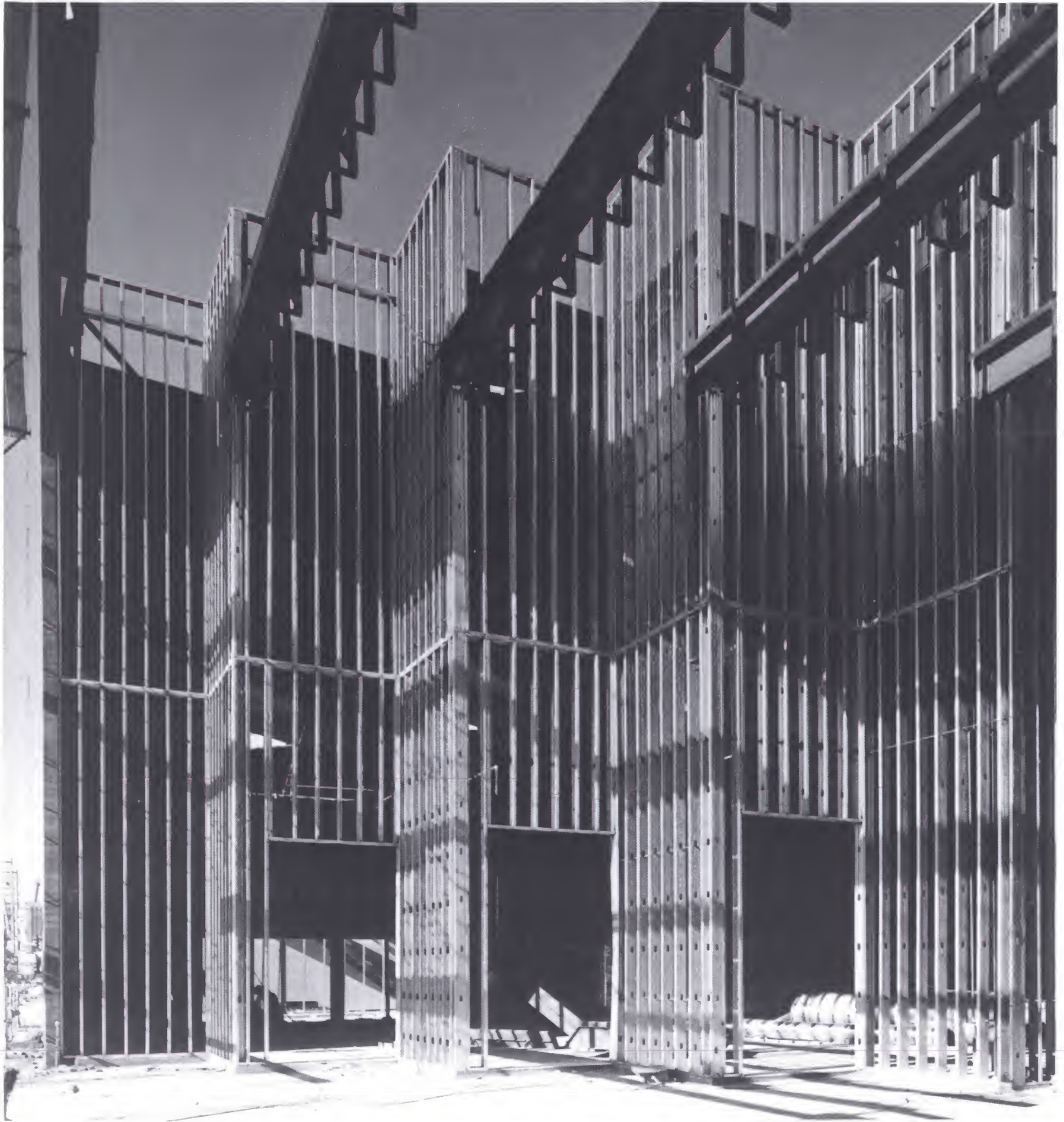
SJ Studs: Allowable Axial Loads (lbs)

Exterior Wall

Height (ft)	Spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
		20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
8	12	1365*	2427	3755	4993	1520	2777	4561	6692
	16	716*	1722	2981	4180	968*	2126	3778	5758
	24		494*	1623*	2741		963*	2384	4098
9	12	781*	1737*	2937	4094	1021*	2141	3728	5618
	16		970*	2082*	3178	404*	1405*	2839	4555
	24			619†	1602*		126†	1300*	2721*
10	12	262†	1099*	2156*	3206	545†	1518*	2899	4535
	16		301†	1259*	2232*		728*	1945*	3397*
	24				582†			322†	1469*
11	12		538†	1454†	2384*	113†	942†	2123*	3516*
	16			540†	1384†		122†	1136†	2346*
	24								380†
12	12			842†	1654†		429†	1429†	2604*
	16				649†			429†	1427†
	24								
14	12				483†			300†	1129†
	16								
	24								
16	12								
	16								
	24								
18	12								
	16								
	24								
20	12								
	16								
	24								

Height (ft)	Spacing (in o.c.)	60 SJ (6")				725 SJ (7 1/4")			80 SJ (8")		
		20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
8	12	3150	4957	6979	9436	4634	6849	9715	4520	7168	10813
	16	2700	4505	6939	9436	4634	6849	9715	4520	7168	10813
	24	1840	3539	5845	8623	4051	6663	9715	4257	7168	10813
9	12	2743	4537	6956	9436	4634	6849	9715	4520	7168	10813
	16	2190	3911	6241	9050	4337	6849	9715	4504	7168	10813
	24	1155	2732	4891	7489	3470	5968	9166	3771	6735	10813
10	12	2298	4010	6326	9116	4429	6849	9715	4520	7168	10813
	16	1647	3263	5463	8112	3882	6433	9700	4127	7165	10813
	24	457*	1890	3873	6258	2832	5195	8210	3232	6039	9905
11	12	1829	3441	5630	8262	4034	6593	9715	4263	7168	10813
	16	1093	2586	4632	7091	3383	5820	8932	3710	6619	10615
	24		1049*	2835	4983	2155	4360	7165	2647	5275	8890
12	12	1354	2850	4890	7338	3603	6057	9186	3906	6845	10813
	16	550*	1905	3778	6026	2851	5156	8089	3258	6019	9804
	24		241*	1820*	3720	1455	3485	6058	2029	4458	7795
14	12	446†	1683*	3391	5427	2669	4863	7636	3110	5765	9377
	16		619*	2129*	3935*	1737	3734	6252	2277	4695	7987
	24				1394*		1717*	3792	748*	2740	5471
16	12		637†	2015*	3647*	1708*	3599	5965	2247	4567	7690
	16			688†	2085*	646*	2306*	4381	1259*	3294	6044
	24							1652*		1045*	3165*
18	12			848†	2132†	796†	2378*	4335*	1378*	3344	5958
	16				559†		989†	2643*	277†	1930*	4149*
	24										1058*
20	12				894†		1275†	2862*	556†	2180*	4318*
	16							1126†		683†	2425*
	24										

Allowable axial loads based on SJ members with 40 ksi yield strength (Fy). Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Deflection limitations are shown by loads in black ink only for L/360; * for L/240; † for L/120; and + for greater than L/120. Axial loads are based on mechanical bracing installed 48" o.c. maximum. See Design Considerations, page 39.



Unimast makes SJ, SN and ST studs for curtain wall applications.

Studs used in curtain wall systems provide support for the exterior and interior wall materials and resist wind (lateral) loads. The tables in this section provide information on limiting heights and sizing recommendations for lateral loaded studs only and do not apply to axial load bearing studs. See pages 14-21 for axial load bearing information.

Unimast SJ studs are manufactured for structural

applications and offer additional strength for curtain wall applications. In addition, Unimast has SN studs for curtain wall applications available in 20, 18, 16 and 14-gauge steel and three standard depths. 20-gauge studs may also be used under certain conditions for curtain walls. The following table identifies limiting heights for curtain wall applications.

SJ (3 5/8", 4")



SJ (6", 7 1/4", 8")



Table 26a

SJ Studs: Curtain Wall Limiting Heights							Stud Properties Only			
Wind load	Deflection limitation	Stud spacing (in o.c.)	362 SJ (3 5/8")				40 SJ (4")			
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	13'4"	14'7"	15'9"	16'10"	14'4"	15'8"	16'11"	18'2"
		16	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"
		24	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
	L/360	12	11'8"	12'9"	13'9"	14'9"	12'6"	13'8"	14'10"	15'10"
		16	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		24	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"
	L/600	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
20 psf	L/240	12	12'1"	13'3"	14'4"	15'4"	13'0"	14'3"	15'5"	16'6"
		16	11'0"	12'0"	13'0"	13'11"	11'10"	12'11"	14'0"	15'0"
		24	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
	L/360	12	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
	L/600	12	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		16	8'1"	8'10"	9'7"	10'3"	8'9"	9'6"	10'4"	11'0"
		24	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
25 psf	L/240	12	11'3"	12'3"	13'3"	14'2"	12'1"	13'3"	14'4"	15'4"
		16	10'2"	11'2"	12'1"	12'11"	11'0"	12'0"	13'0"	13'11"
		24	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
	L/360	12	9'10"	10'9"	11'7"	12'5"	10'7"	11'7"	12'6"	13'4"
		16	8'11"	9'9"	10'6"	11'3"	9'7"	10'6"	11'4"	12'2"
		24	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
	L/600	12	8'3"	9'1"	9'9"	10'6"	8'11"	9'9"	10'6"	11'3"
		16	7'6"	8'3"	8'11"	9'6"	8'1"	8'10"	9'7"	10'3"
		24	6'7"	7'2"	7'9"	8'4"	7'1"	7'9"	8'4"	8'11"
30 psf	L/240	12	10'7"	11'7"	12'6"	13'4"	11'4"	12'5"	13'5"	14'5"
		16	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		24	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
	L/360	12	9'3"	10'1"	10'11"	11'8"	9'11"	10'10"	11'9"	12'7"
		16	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
		24	7'4"	8'0"	8'8"	9'3"	7'11"	8'8"	9'4"	10'0"
	L/600	12	7'9"	8'6"	9'2"	9'10"	8'5"	9'2"	9'11"	10'7"
		16	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
		24	6'2"	6'9"	7'4"	7'10"	6'8"	7'3"	7'10"	8'5"
35 psf	L/240	12	10'1"	11'0"	11'10"	12'8"	10'10"	11'10"	12'9"	13'8"
		16	9'1"	10'0"	10'9"	11'6"	9'10"	10'9"	11'7"	12'5"
		24	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"
	L/360	12	8'9"	9'7"	10'4"	11'1"	9'5"	10'4"	11'2"	11'11"
		16	8'0"	8'9"	9'5"	10'1"	8'7"	9'5"	10'2"	10'10"
		24	7'0"	7'7"	8'3"	8'10"	7'6"	8'2"	8'10"	9'6"
	L/600	12	7'5"	8'1"	8'9"	9'4"	8'0"	8'9"	9'5"	10'1"
		16	6'9"	7'4"	7'11"	8'6"	7'3"	7'11"	8'7"	9'2"
		24	5'10"	6'5"	6'11"	7'5"	6'4"	6'11"	7'6"	8'0"
40 psf	L/240	12	9'7"	10'6"	11'4"	12'2"	10'4"	11'4"	12'3"	13'1"
		16	8'9"	9'7"	10'4"	11'0"	9'5"	10'3"	11'1"	11'11"
		24	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"
	L/360	12	8'5"	9'2"	9'11"	10'7"	9'0"	9'11"	10'8"	11'5"
		16	7'7"	8'4"	9'0"	9'8"	8'2"	9'0"	9'8"	10'5"
		24	6'8"	7'3"	7'10"	8'5"	7'2"	7'10"	8'6"	9'1"
	L/600	12	7'1"	7'9"	8'4"	8'11"	7'7"	8'4"	9'0"	9'8"
		16	6'5"	7'0"	7'7"	8'2"	6'11"	7'7"	8'2"	8'9"
		24	5'7"	6'2"	6'8"	7'1"	6'1"	6'7"	7'2"	7'8"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side based on the properties of the studs alone with a 33% increase for wind loading. Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. See Design Considerations, page 39.

Steel framing is superior for modern construction designs.



Table 26b

SJ Studs: Curtain Wall Limiting Heights

Stud Properties Only

Wind load	Deflection limitation	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7¼")			80 SJ (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	19'10"	21'9"	23'7"	25'3"	25'4"	27'6"	29'6"	27'6"	29'10"	32'0"
		16	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	25'0"	27'1"	29'1"
		24	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
	L/360	12	17'4"	19'0"	20'7"	22'1"	22'2"	24'0"	25'9"	24'0"	26'0"	27'11"
		16	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		24	13'9"	15'1"	16'4"	17'6"	17'7"	19'1"	20'5"	19'1"	20'8"	22'2"
	L/600	12	14'7"	16'0"	17'4"	18'7"	18'8"	20'3"	21'9"	20'3"	22'0"	23'7"
		16	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		24	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
20 psf	L/240	12	18'0"	19'9"	21'5"	22'11"	23'0"	25'0"	26'9"	25'0"	27'1"	29'1"
		16	16'5"	17'11"	19'5"	20'10"	20'11"	22'8"	24'4"	22'8"	24'7"	26'5"
		24	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
	L/360	12	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		16	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		24	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
	L/600	12	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		16	12'1"	13'3"	14'4"	15'5"	15'5"	16'9"	17'11"	16'9"	18'2"	19'5"
		24	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
25 psf	L/240	12	16'9"	18'4"	19'10"	21'3"	21'5"	23'2"	24'10"	23'2"	25'2"	27'0"
		16	15'2"	16'8"	18'1"	19'4"	19'5"	21'1"	22'7"	21'1"	22'10"	24'6"
		24	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
	L/360	12	14'7"	16'0"	17'4"	18'7"	18'8"	20'3"	21'9"	20'3"	22'0"	23'7"
		16	13'3"	14'7"	15'9"	16'11"	17'0"	18'5"	19'9"	18'5"	19'11"	21'5"
		24	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
	L/600	12	12'4"	13'6"	14'8"	15'8"	15'9"	17'1"	18'4"	17'1"	18'6"	19'10"
		16	11'2"	12'3"	13'4"	14'3"	14'4"	15'6"	16'8"	15'6"	16'10"	18'1"
		24	9'9"	10'9"	11'7"	12'5"	12'6"	13'7"	14'6"	13'7"	14'8"	15'9"
30 psf	L/240	12	15'9"	17'3"	18'8"	20'0"	20'2"	21'10"	23'5"	21'10"	23'8"	25'4"
		16	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	21'10"	21'6"	23'1"
		24	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
	L/360	12	13'9"	15'1"	16'4"	17'6"	17'7"	19'1"	20'5"	19'1"	20'8"	22'2"
		16	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
		24	10'11"	12'0"	13'0"	13'11"	13'11"	15'2"	16'3"	15'2"	16'5"	17'7"
	L/600	12	11'7"	12'9"	13'9"	14'9"	14'10"	16'1"	17'3"	16'1"	17'5"	18'8"
		16	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
		24	9'3"	10'1"	10'11"	11'9"	11'9"	12'9"	13'8"	12'9"	13'10"	14'10"
35 psf	L/240	12	15'0"	16'5"	17'9"	19'0"	19'1"	20'9"	22'3"	20'9"	22'6"	24'1"
		16	13'7"	14'11"	16'2"	17'3"	17'4"	18'10"	20'2"	18'10"	20'5"	21'11"
		24	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	16'5"	17'10"	19'2"
	L/360	12	13'1"	14'4"	15'6"	16'7"	16'8"	18'1"	19'5"	18'1"	19'8"	21'1"
		16	11'10"	13'0"	14'1"	15'1"	15'2"	16'5"	17'8"	16'5"	17'10"	19'2"
		24	10'4"	11'4"	12'4"	13'2"	13'3"	14'4"	15'5"	14'4"	15'7"	16'9"
	L/600	12	11'0"	12'1"	13'1"	14'0"	14'1"	15'3"	16'4"	15'3"	16'7"	17'9"
		16	10'0"	11'0"	11'11"	12'9"	12'10"	13'10"	14'11"	13'11"	15'1"	16'2"
		24	8'9"	9'7"	10'5"	11'2"	11'2"	12'1"	13'0"	12'1"	13'2"	14'1"
40 psf	L/240	12	14'4"	15'8"	17'0"	18'2"	18'3"	19'10"	21'3"	19'10"	21'6"	23'1"
		16	13'0"	14'3"	15'5"	16'6"	16'7"	18'0"	19'4"	18'0"	19'6"	20'11"
		24	11'4"	12'5"	13'6"	14'5"	14'6"	15'9"	16'10"	15'9"	17'1"	18'4"
	L/360	12	12'6"	13'8"	14'10"	15'11"	16'0"	17'4"	18'7"	17'4"	18'9"	20'2"
		16	11'4"	12'5"	13'6"	14'5"	14'6"	15'9"	16'10"	15'9"	17'1"	18'4"
		24	9'11"	10'10"	11'9"	12'7"	12'8"	13'9"	14'9"	13'9"	14'11"	16'0"
	L/600	12	10'7"	11'7"	12'6"	13'5"	13'6"	14'7"	15'8"	14'7"	15'10"	17'0"
		16	9'7"	10'6"	11'4"	12'2"	12'3"	13'3"	14'2"	13'3"	14'5"	15'5"
		24	8'4"	9'2"	9'11"	10'8"	10'8"	11'7"	12'5"	11'7"	12'7"	13'6"

Table 27

SJ Studs: Curtain Wall Limiting Heights

Sheathing Both Sides

Wind load	Deflection limitation	Stud spacing (in o.c.)	362 SJ (3¾")				40 SJ (4")							
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge				
15 psf	L/240	12	14'2"	15'3"	16'4"	17'5"	15'2"	16'5"	17'7"	18'8"				
		16	13'1"	14'1"	15'0"	15'11"	14'0"	15'1"	16'2"	17'2"				
		24	11'5"	12'4"	13'2"	13'11"	12'3"	13'2"	14'1"	15'0"				
	L/360	12	12'4"	13'4"	14'3"	15'2"	13'3"	14'4"	15'4"	16'4"				
		16	11'5"	12'4"	13'2"	13'11"	12'3"	13'2"	14'1"	15'0"				
		24	10'0"	10'9"	11'6"	12'2"	10'9"	11'6"	12'4"	13'1"				
20 psf	L/240	12	12'10"	13'11"	14'10"	15'10"	13'9"	14'11"	16'0"	17'0"				
		16	11'11"	12'10"	13'8"	14'6"	12'9"	13'9"	14'8"	15'7"				
		24	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"				
	L/360	12	11'3"	12'2"	13'0"	13'10"	12'1"	13'0"	13'11"	14'10"				
		16	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"				
		24	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"				
25 psf	L/240	12	11'11"	12'11"	13'10"	14'8"	12'10"	13'10"	14'10"	15'9"				
		16	11'1"	11'11"	12'8"	13'5"	11'10"	12'9"	13'7"	14'5"				
		24	9'8"	10'5"	11'1"	11'9"	10'4"	11'2"	11'11"	12'8"				
	L/360	12	10'5"	11'3"	12'1"	12'10"	11'2"	12'1"	12'11"	13'9"				
		16	9'8"	10'5"	11'1"	11'9"	10'4"	11'2"	11'11"	12'8"				
		24	8'5"	9'1"	9'8"	10'3"	9'0"	9'9"	10'5"	11'0"				
30 psf	L/240	12	11'3"	12'2"	13'0"	13'10"	12'1"	13'0"	13'11"	14'10"				
		16	10'5"	11'2"	11'11"	12'8"	11'2"	12'0"	12'10"	13'7"				
		24	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"				
	L/360	12	9'10"	10'7"	11'4"	12'1"	10'6"	11'4"	12'2"	13'0"				
		16	9'1"	9'9"	10'5"	11'1"	9'9"	10'6"	11'2"	11'11"				
		24	7'11"	8'6"	9'1"	9'8"	8'6"	9'2"	9'9"	10'5"				
35 psf	L/240	12	10'8"	11'6"	12'4"	13'1"	11'5"	12'4"	13'3"	14'1"				
		16	9'10"	10'7"	11'4"	12'0"	10'7"	11'5"	12'2"	12'11"				
		24	8'7"	9'3"	9'11"	10'6"	9'3"	9'11"	10'8"	11'3"				
	L/360	12	9'4"	10'1"	10'9"	11'5"	10'0"	10'10"	11'7"	12'4"				
		16	8'7"	9'3"	9'11"	10'6"	9'3"	9'11"	10'8"	11'3"				
		24	7'6"	8'1"	8'8"	9'2"	8'1"	8'8"	9'4"	9'10"				
40 psf	L/240	12	10'2"	11'0"	11'10"	12'6"	10'11"	11'10"	12'8"	13'6"				
		16	9'5"	10'2"	10'10"	11'6"	10'1"	10'11"	11'8"	12'4"				
		24	8'3"	8'10"	9'6"	10'1"	8'10"	9'6"	10'2"	10'10"				
	L/360	12	8'11"	9'8"	10'4"	10'11"	9'7"	10'4"	11'1"	11'9"				
		16	8'3"	8'10"	9'6"	10'1"	8'10"	9'6"	10'2"	10'10"				
		24	7'2"	7'9"	8'3"	8'9"	7'9"	8'4"	8'11"	9'5"				
Wind load	Deflection limitation	Stud spacing (in o.c.)	60 SJ (6")				725 SJ (7¼")				80 SJ (8")			
			20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge
15 psf	L/240	12	20'9"	22'6"	24'3"	25'10"	26'2"	28'2"	30'1"	28'4"	30'7"	32'7"	28'4"	30'7"
		16	19'2"	20'9"	22'3"	23'8"	24'1"	25'10"	27'6"	26'0"	28'0"	29'10"	26'0"	28'0"
		24	16'9"	18'1"	19'5"	20'8"	21'0"	22'7"	24'0"	22'9"	24'5"	26'1"	22'9"	24'5"
	L/360	12	18'2"	19'8"	21'2"	22'7"	22'11"	24'8"	26'3"	24'9"	26'8"	28'6"	24'9"	26'8"
		16	16'9"	18'1"	19'5"	20'8"	21'0"	22'7"	24'0"	22'9"	24'5"	26'1"	22'9"	24'5"
		24	14'7"	15'10"	17'0"	18'1"	18'4"	19'9"	21'0"	19'10"	21'4"	22'9"	19'10"	21'4"
20 psf	L/240	12	18'11"	20'6"	22'0"	23'6"	23'10"	25'8"	27'4"	25'9"	27'9"	29'7"	25'9"	27'9"
		16	17'5"	18'10"	20'2"	21'6"	21'10"	23'6"	25'0"	23'8"	25'5"	27'1"	23'8"	25'5"
		24	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"	20'8"	22'2"
	L/360	12	16'6"	17'11"	19'3"	20'6"	20'10"	22'5"	23'10"	22'6"	24'3"	25'11"	22'6"	24'3"
		16	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"	20'8"	22'2"
		24	13'3"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	18'1"	19'5"	20'8"	18'1"	19'5"
25 psf	L/240	12	17'6"	19'0"	20'5"	21'9"	22'1"	23'9"	25'4"	23'11"	25'9"	27'6"	23'11"	25'9"
		16	16'2"	17'6"	18'9"	19'11"	20'3"	21'10"	23'2"	21'11"	23'7"	25'2"	21'11"	23'7"
		24	12'10"	15'3"	16'5"	17'5"	17'9"	19'0"	20'3"	19'2"	20'7"	22'0"	19'2"	20'7"
	L/360	12	15'4"	16'7"	17'10"	19'0"	19'4"	20'9"	22'2"	20'11"	22'6"	24'0"	20'11"	22'6"
		16	14'1"	15'3"	16'5"	17'5"	17'9"	19'0"	20'3"	19'2"	20'7"	22'0"	19'2"	20'7"
		24	12'4"	13'4"	14'4"	15'3"	15'6"	16'8"	17'8"	16'9"	18'0"	19'2"	16'9"	18'0"
30 psf	L/240	12	16'6"	17'11"	19'3"	20'6"	20'10"	22'5"	23'10"	22'6"	24'3"	25'11"	22'6"	24'3"
		16	15'3"	16'5"	17'8"	18'9"	19'1"	20'6"	21'10"	20'8"	22'2"	23'8"	20'8"	22'2"
		24	10'8"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	16'9"	19'5"	20'8"	16'9"	19'5"
	L/360	12	14'5"	15'8"	16'10"	17'11"	18'2"	19'7"	20'10"	19'8"	21'2"	22'7"	19'8"	21'2"
		16	13'3"	14'4"	15'5"	16'5"	16'8"	17'11"	19'1"	18'1"	19'5"	20'8"	18'1"	19'5"
		24	10'8"	12'7"	13'6"	14'4"	14'7"	15'8"	16'8"	15'9"	16'11"	18'1"	15'9"	16'11"
35 psf	L/240	12	15'8"	17'0"	18'3"	19'6"	19'9"	21'3"	22'8"	21'5"	23'0"	24'7"	21'5"	23'0"
		16	13'9"	15'7"	16'9"	17'10"	18'2"	19'6"	20'9"	19'7"	21'1"	22'6"	19'7"	21'1"
		24	9'2"	13'8"	14'8"	15'7"	15'10"	17'0"	18'1"	14'4"	18'5"	19'8"	14'4"	18'5"
	L/360	12	13'8"	14'10"	16'0"	17'0"	17'3"	18'7"	19'10"	18'8"	20'1"	21'6"	18'8"	20'1"
		16	12'7"	13'8"	14'8"	15'7"	15'10"	17'0"	18'1"	17'2"	18'5"	19'8"	17'2"	18'5"
		24	9'2"	11'11"	12'9"	13'7"	13'10"	14'10"	15'10"	14'4"	16'1"	17'2"	14'4"	16'1"
40 psf	L/240	12	15'0"	16'3"	17'6"	18'8"	18'11"	20'4"	21'8"	20'5"	22'0"	23'6"	20'5"	22'0"
		16	12'0"	14'11"	16'0"	17'1"	17'4"	18'8"	19'10"	18'9"	20'2"	21'6"	18'9"	20'2"
		24	8'0"	12'10"	14'0"	14'11"	14'3"	16'3"	17'4"	12'7"	17'7"	18'9"	12'7"	17'7"
	L/360	12	13'1"	14'2"	15'3"	16'3"	16'6"	17'9"	18'11"	17'0"	19'3"	20'6"	17'0"	19'3"
		16	12'0"	13'1"	14'0"	14'11"	15'2"	16'3"	17'4"	16'5"	17'7"	18'9"	16'5"	17'7"
		24	8'0"	11'5"	12'3"	13'0"	13'3"	14'3"	15'2"	12'7"	15'5"	16'5"	12'7"	15'5"

Limiting heights are for SJ members with 40 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Contact Unimast Technical Department for information on 33 ksi and 50 ksi members. Stress based on the properties of the studs alone with a 33% increase for wind loading. Deflection based on composite wall assembly (gypsum sheathing and dry exterior finish and drywall or plaster interior) without addition of the exterior finish stiffness. See Design Considerations, page 39.

Table 28

SN Studs: Curtain Wall Limiting Heights											Stud Properties Only		
Wind load	Deflection limitation	Stud spacing (in o.c.)	358 SN (3½")				600 SN (6")				800 SN (8")		
			20 gauge	18 gauge	16 gauge	14 gauge	20 gauge	18 gauge	16 gauge	14 gauge	18 gauge	16 gauge	14 gauge
15 psf	L/240	12	12'6"	13'8"	14'7"	15'8"	18'7"	20'5"	21'10"	23'5"	25'11"	27'7"	29'10"
		16	11'5"	12'5"	13'2"	14'2"	16'11"	18'6"	19'10"	21'4"	23'6"	25'1"	27'1"
		24	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
20 psf	L/360	12	10'11"	11'11"	12'8"	13'8"	16'4"	17'9"	19'0"	20'6"	22'7"	24'1"	26'0"
		16	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		24	8'9"	9'6"	10'1"	10'11"	12'11"	14'1"	15'1"	16'4"	17'11"	19'2"	20'7"
25 psf	L/240	12	11'5"	12'5"	13'2"	14'2"	16'11"	18'6"	19'10"	21'4"	23'6"	25'1"	27'1"
		16	10'4"	11'4"	12'0"	12'11"	15'5"	16'9"	18'0"	19'5"	21'5"	22'10"	24'7"
		24	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
30 psf	L/360	12	9'11"	10'11"	11'7"	12'5"	14'10"	16'2"	17'4"	18'7"	20'6"	21'11"	23'7"
		16	9'0"	9'11"	10'6"	11'4"	13'5"	14'8"	15'8"	16'11"	18'8"	19'11"	21'6"
		24	7'11"	8'7"	9'2"	9'11"	11'8"	12'11"	13'8"	14'10"	16'4"	17'5"	18'10"
35 psf	L/240	12	10'6"	11'6"	12'4"	13'2"	15'8"	17'2"	18'5"	19'10"	21'10"	23'4"	25'1"
		16	9'7"	10'6"	11'2"	12'0"	14'4"	15'7"	16'8"	18'0"	19'4"	21'2"	22'10"
		24	8'5"	9'2"	9'8"	10'6"	12'6"	13'8"	14'7"	15'8"	17'1"	18'6"	19'11"
40 psf	L/360	12	9'2"	10'1"	10'8"	11'6"	13'8"	15'0"	16'0"	17'4"	19'1"	20'5"	21'11"
		16	8'5"	9'2"	9'8"	10'6"	12'6"	13'8"	14'7"	15'8"	17'1"	18'6"	19'11"
		24	7'4"	8'0"	8'6"	9'2"	10'11"	11'11"	12'8"	13'8"	15'1"	16'2"	17'5"

Table 29

ST20 Studs: Curtain Wall Limiting Heights										Stud Properties Only			
Wind load	Stud spacing (in o.c.)	L/240				L/360				L/600			
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 psf	12	9'1"	12'2"	13'2"	18'2"	8'0"	10'7"	11'6"	15'10"	6'8"	9'0"	9'8"	13'4"
	16	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	24	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'1"	7'8"	10'8"
20 psf	12	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	16	7'6"	10'1"	10'10"	15'0"	6'7"	8'9"	9'6"	13'1"	5'7"	7'4"	8'0"	11'1"
	24	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
25 psf	12	7'8"	10'3"	11'1"	15'4"	6'8"	9'0"	9'8"	13'4"	5'8"	7'7"	8'2"	11'3"
	16	7'0"	9'3"	10'1"	14'0"	6'1"	8'2"	8'9"	12'2"	5'2"	6'10"	7'4"	10'3"
	24	6'1"	8'2"	8'9"	12'2"	5'3"	7'1"	7'8"	10'8"	4'6"	6'0"	6'6"	9'0"
30 psf	12	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'2"	7'8"	10'8"
	16	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	24	5'9"	7'8"	8'3"	11'6"	5'0"	6'8"	7'2"	10'0"	4'2"	5'8"	6'1"	8'6"
35 psf	12	6'10"	9'2"	9'10"	13'8"	6'0"	8'0"	8'8"	12'0"	5'1"	6'9"	7'3"	10'1"
	16	6'3"	8'3"	9'0"	12'6"	5'6"	7'3"	7'10"	10'10"	4'7"	6'2"	6'7"	9'2"
	24	5'6"	7'3"	7'10"	10'10"	4'9"	6'4"	6'10"	9'6"	4'0"	5'4"	5'9"	8'0"
40 psf	12	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	16	6'0"	8'0"	8'7"	11'10"	5'2"	7'0"	7'6"	10'4"	4'4"	5'10"	6'4"	8'9"
	24	5'2"	7'0"	7'6"	10'4"	4'7"	6'1"	6'7"	9'1"	3'10"	5'1"	6'7"	7'8"

Table 30

ST20 Studs: Curtain Wall Limiting Heights										Sheathing Both Sides			
Wind load	Stud spacing (in o.c.)	Deflection criteria											
		L/240				L/360				L/600			
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 psf	12	12'2"	16'1"	17'4"	23'9"	9'8"	12'9"	13'9"	18'10"	8'6"	11'2"	12'0"	16'6"
	16	11'0"	14'6"	15'6"	20'8"	9'0"	11'9"	12'8"	17'4"	7'9"	10'3"	11'1"	15'2"
	24	9'0"	11'9"	12'8"	16'10"	8'1"	10'7"	11'4"	15'6"	7'1"	9'2"	9'10"	13'6"
20 psf	12	11'0"	14'6"	15'6"	20'8"	8'9"	11'7"	12'6"	17'2"	7'8"	10'1"	10'10"	15'0"
	16	9'6"	12'6"	13'4"	17'10"	8'1"	10'8"	11'6"	15'9"	7'1"	9'4"	10'1"	13'9"
	24	7'9"	10'2"	11'0"	14'7"	7'4"	9'7"	10'3"	14'1"	6'4"	8'4"	9'0"	12'3"
25 psf	12	9'9"	12'10"	13'10"	18'6"	8'2"	10'9"	11'7"	15'10"	7'1"	9'4"	10'2"	13'10"
	16	8'6"	11'2"	12'0"	16'0"	7'7"	9'10"	10'8"	14'7"	6'7"	8'8"	9'4"	12'9"
	24	6'10"	9'1"	9'9"	13'1"	6'9"	8'10"	9'7"	13'1"	6'0"	7'9"	8'4"	11'4"
30 psf	12	9'0"	11'9"	12'8"	16'10"	7'8"	10'1"	10'10"	15'0"	6'8"	8'10"	9'7"	13'1"
	16	7'9"	10'2"	11'0"	14'7"	7'1"	9'4"	10'1"	13'9"	6'2"	8'2"	8'9"	12'0"
	24	6'3"	8'3"	9'0"	12'0"	6'3"	8'3"	9'0"	12'0"	5'7"	7'3"	7'10"	10'8"
35 psf	12	8'3"	10'10"	11'8"	15'7"	7'3"	9'7"	10'4"	14'2"	6'4"	8'4"	9'1"	12'4"
	16	7'2"	9'6"	10'2"	13'7"	6'4"	8'10"	9'7"	13'1"	5'10"	7'9"	8'4"	11'4"
	24	5'10"	7'8"	8'3"	11'1"	5'10"	7'8"	8'3"	11'1"	5'3"	7'0"	7'6"	10'2"
40 psf	12	7'9"	10'2"	11'0"	14'7"	7'0"	9'2"	9'10"	13'7"	6'1"	8'1"	8'8"	11'10"
	16	6'8"	8'9"	9'6"	12'8"	6'6"	8'6"	9'2"	12'6"	5'8"	7'4"	8'0"	10'10"
	24	5'6"	7'2"	7'9"	10'4"	5'6"	7'2"	7'9"	10'4"	5'1"	6'8"	7'2"	9'9"

Limiting heights are for ST20 members with 33 ksi yield strength (Fy) and based on lateral bracing provided by mechanically fastened gypsum board or sheathing each side. Stress based on the properties of studs alone increased 33% for wind loading. Deflection based on composite wall assembly (gypsum sheathing and dry exterior finish and drywall or plaster interior) without addition of the exterior finish stiffness. See Design Considerations, page 39.

Drywall partitions are designed to withstand a 5 psf lateral load but are not designed to carry axial loads. ST studs are typically used for interior nonload-bearing partitions but SN and SJ members may be used when the heights exceed those allowed with ST drywall studs.

Table 31

Interior Framing: Limiting Heights

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furred wall, one layer
25 gauge (.0179" min.)					
158ST25	16"	L/120	10'9"f	10'9"d	10'3"d
		L/240	9'6"d	10'6"d	8'3"d
		L/360	8'3"d	9'0"d	7'3"d
	24"	L/120	8'9"f	8'9"f	8'9"f
212ST25	16"	L/120	13'9"f	13'9"f	13'9"d*
		L/240	12'6"d	13'6"d	11'0"d
		L/360	10'9"d	11'9"d	9'9"d
	24"	L/120	11'3"f	11'3"f	11'3"f
358ST25	16"	L/120	16'9"f	16'9"f	16'9"f*
		L/240	16'0"d	16'9"f	14'6"d*
		L/360	14'0"d	14'9"f	12'9"d*
	24"	L/120	13'6"f	13'6"f	13'6"f*
400ST25	16"	L/120	17'3"f	17'3"f	17'3"f*
		L/240	17'3"d	17'3"f	15'9"d*
		L/360	15'0"d	15'9"d*	13'9"d*
	24"	L/120	14'3"f	14'3"f	14'3"f*
600ST25	16"	L/120	20'0"f	20'0"f	20'0"f*
		L/240	20'0"f	20'0"f	20'0"f*
		L/360	20'0"f	20'0"f	18'9"f*
	24"	L/120	15'0"v	15'0"v	15'0"v*
22 gauge (.0270" min.)					
212ST22	16"	L/120	16'6"d	17'0"f	15'3"d*
		L/240	13'0"d	14'0"d	12'0"d
		L/360	11'6"d	12'3"d	10'6"d
	24"	L/120	14'0"f	14'0"f	13'3"d*
358ST22	16"	L/120	21'9"d	22'0"f	20'3"d*
		L/240	17'3"d	18'0"d	16'0"d*
		L/360	15'0"d	15'9"d	14'0"d*
	24"	L/120	18'0"f	18'0"f	17'9"d*
400ST22	16"	L/120	23'3"f	23'3"f	21'9"d*
		L/240	18'6"d	19'3"d	17'3"d*
		L/360	16'3"d	16'9"d	15'0"d*
	24"	L/120	19'0"f	19'0"f	19'0"f*
600ST22	16"	L/120	29'0"f	29'0"f	29'0"f*
		L/240	25'3"d	26'0"d	23'9"d*
		L/360	22'0"d	22'9"d	20'9"d*
	24"	L/120	23'6"f	23'6"f	23'6"f*

Limiting heights for 1/2" or 5/8" thick gypsum panels and 5 psf uniform load perpendicular to partition or furring. Use one layer heights for unbalanced assemblies; use two layer heights for multi-layer assemblies. For furring, stud attached to top and bottom runners and free-standing up to 12 ft. height. *Studs exceeding 12 ft. height require mid-height anchor to exterior wall. Assemblies without face panels and chase wall partitions require vertical cross braces 4 ft. o.c. maximum. Limiting criteria: d - deflection, f - bending stress, v - end reaction shear. Consult local code authority for limiting criteria.

The following tables contain limiting heights for ST studs in interior partitions and chase walls. Limiting heights for 362SJ20 and 40SJ20 are also shown. Limiting heights for other SJ members and for tall walls are available from the Unimast Technical Department nearest you.

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furred wall, one layer
20 gauge (.0312" min.)					
212ST20	16"	L/120	17'4"d	17'11"f	16'6"d*
		L/240	13'10"d	16'1"d	13'0"d*
		L/360	12'0"d	14'0"d	11'6"d*
	24"	L/120	14'7"f	14'7"f	14'6"d*
358ST20	16"	L/120	22'7"d	23'8"f	21'9"d*
		L/240	17'11"d	20'2"d	17'3"d*
		L/360	15'7"d	17'8"d	15'0"d*
	24"	L/120	19'4"f	19'4"f	19'0"d*
400ST20	16"	L/120	24'3"d	25'6"f	23'6"d*
		L/240	19'2"d	21'7"d	18'9"d*
		L/360	16'10"d	18'11"d	16'3"d*
	24"	L/120	20'9"f	20'9"f	20'6"d*
600ST20	16"	L/120	32'11"d	33'11"f	32'3"d*
		L/240	26'1"d	28'6"d	25'6"d*
		L/360	22'10"d	24'11"d	23'3"d*
	24"	L/120	25'3"f	25'3"f	28'0"d*
SJ style (.0341" min.)					
362SJ20	16"	L/120	24'0"d	25'0"d	23'0"d*
		L/240	19'0"d	19'9"d	18'3"d*
		L/360	16'9"d	17'3"d	16'0"d*
	24"	L/120	21'0"d	21'9"d	20'3"d*
40SJ20	16"	L/120	25'9"d	26'9"d	24'9"d*
		L/240	20'6"d	21'3"d	19'9"d*
		L/360	18'0"d	18'6"d	17'3"d*
	24"	L/120	22'6"d	23'3"d	21'6"d*

Table 32

Chase Wall: Limiting Heights

Member	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers
158ST25	16"	L/120	15'3"f	15'3"f
		L/240	13'3"d	14'6"d
		L/360	11'6"d	12'9"d
	24"	L/120	12'6"f	12'6"f
212ST25	16"	L/120	19'6"f	19'6"f
		L/240	17'6"d	19'0"d
		L/360	15'6"d	16'6"d
	24"	L/120	16'0"f	16'0"f
358ST25	16"	L/120	23'6"f	23'6"f
		L/240	22'9"d	23'6"f
		L/360	19'9"d	21'3"d
	24"	L/120	19'3"f	19'3"f

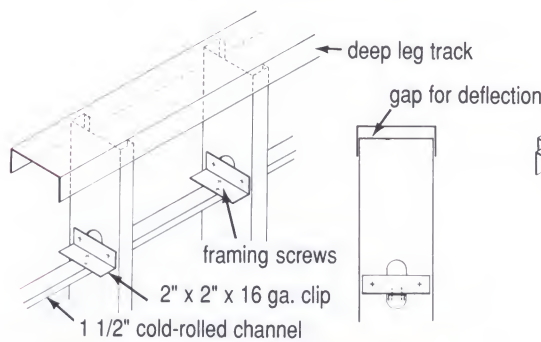
Curtain wall slip tracks may be required to accommodate the deflection of floor beams or floor decks above curtain wall or interior partitions. Slip tracks cannot be used in axial load bearing stud conditions or above continuous window spandrels.

Details for a single slip track and a double slip track, using custom deep leg tracks, are shown below. The single track detail requires 1½" cold-rolled channel and 1½" x 2" x 16-gauge clips installed

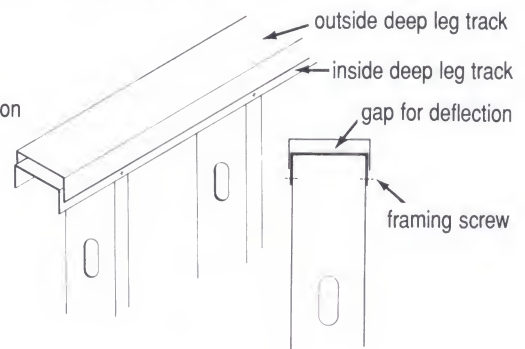
continuously through the uppermost punchouts to align the studs vertically within the plane of the wall.

Slip track details must be designed for the specific conditions of a building to accommodate the required deflection and the end reactions of the studs. The deep leg tracks are not standard and the gauge, width and leg length must be specified for each particular application. All detailing and connections should be specified by a qualified engineer or architect.

Single slip track



Double slip track



CURTAIN WALL SLIDE CLIP

Curtain wall slide clips attach Unimast SJ, SN or ST studs used in curtain wall applications to horizontal supports, while allowing vertical movement of the structure without transferring compressive loads to the studs.

The curtain wall slide clip resists tension loads caused by *negative* wind pressure (suction) on exterior curtain walls. Based on the gauge of stud being used, the safe design loads (lbs.) for the

slide clip are given in the table below. The safe design load is the maximum tension load of the stud/clip combination.

In addition to checking the tension created by negative wind pressure, web crippling of studs with respect to the bearing width must be checked for positive wind pressures. For continuous span conditions, the combined bending and web crippling at interior supports must be checked per AISI Sections C3.4 and C3.5.

Table 33

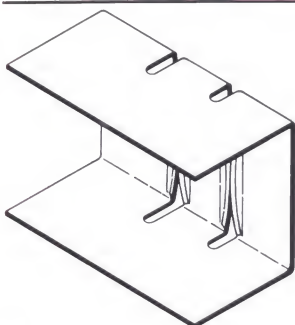
Curtain Wall Slide Clip:
Allowable Design Loads

Stud Style	Stud Gauge/ thickness	Safe Design Load (lbs)
*ST	20 (.0329")	364
*SN	20 (.0329")	364
SN	18 (.0438")	388
SN	16 (.0548")	486
SN	14 (.0697")	618
**SJ	20 (.0359")	482
SJ	18 (.0478")	514
SJ	16 (.0598")	638
SJ	14 (.0747")	638

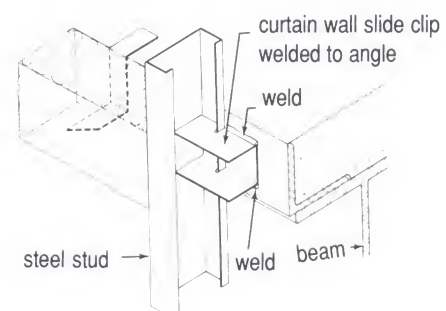
*ST and SN studs $F_y = 33.0$ ksi

**SJ $F_y = 40.0$ ksi

Curtain wall slide clip



Curtain wall slide clip attachment



Curtain wall and interior partition wall surfaces should be isolated with control joints or other means where:

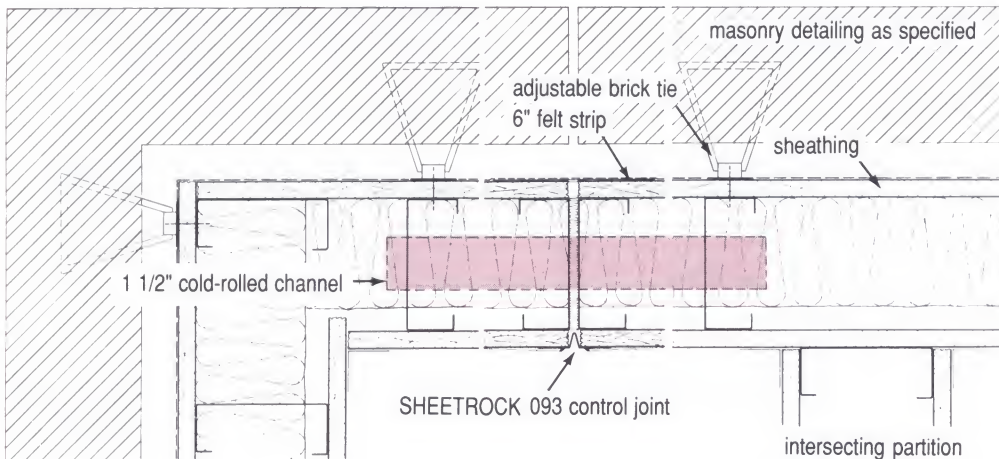
1. A curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;
2. Construction changes within the plane of the wall;
3. Stucco surfaces exceed 10' in either direction;
4. The area within stucco sections exceeds 100 sq. ft.;
5. Required for brick-veneer construction by the Brick Institute of America especially below ledger angle supports;
6. Basic construction contains a control joint;
7. Interior partition run exceeds 30';
8. Exterior soffits exceed 30' in either direction.

Ceiling height door frames may be used as control joints. Less than ceiling height door frames should have control joints extending to the ceiling from both corners.

Framing at control joints that extend through the wall should have 1 1/2" cold-rolled channel alignment stabilizers spaced a maximum of 4' o.c. Channels should be placed through holes in the stud web and be securely attached to the first stud on each side of the control joint.

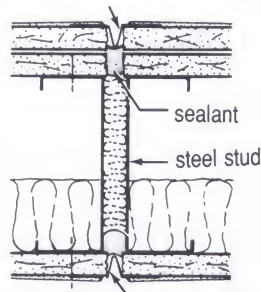
These recommendations are not complete for installation of control joints. Contact sheathing, gypsum board and exterior facing manufacturers for complete details and recommendations.

Exterior control joint (example showing brick veneer)



Interior control joint

SHEETROCK 093 control joint



SHEETROCK 093 control joint

Properly spaced horizontal steel bracing provides resistance to stud rotation and minor axis bending under wind and axial loads. Both stud flanges must be attached to top and bottom runner flanges to provide proper end support. Floor and ceiling runners must also be securely anchored to the structure. To fully utilize the stud's load carrying capacity, horizontal bracing must be installed at proper intervals.

Values in Axial Combined Load Tables are based on studs laterally braced with mechanical bracing installed at a maximum of 48" o.c. For allowable loads for studs with other than bracing 48" o.c., contact the Unimast Technical Departments. AISI Specifications, Section D4, contain methods for calculating the allowable axial loads using gypsum board or sheathing for lateral bracing. Unimast suggests the use of mechanical bracing, 48" o.c., for axially loaded studs, to ensure studs are properly braced during construction and/or remodeling when gypsum board or sheathing may not be present.

Lateral bracing consists of a field

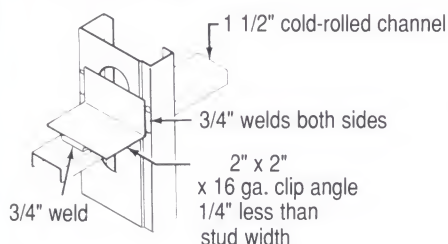
cut CR runner for solid bridging and steel strap bracing on both sides of the studs. Solid bridging is placed at each end of the wall, adjacent to wall openings and 8' o.c. maximum. The solid bridging consists of a runner section with the web flange bent at each end which is then secured to each stud flange. Strap bracing, 1 1/2" wide and 20-gauge, is fastened to each stud flange with one screw and to each solid bridging runner section with four screws.

As an alternate, 1 1/2" cold-rolled channels may be used to brace studs laterally. Channels are inserted through the stud web holes and secured with screw-attached or welded 1 1/2" x 2" x 16-gauge clip angles cut-to-length 1/4" less than the stud width. For studs 3 1/2" or smaller, 16 gauge or heavier, the channel may be secured by welding both channel flanges to the stud.

Adequate lateral bracing must be provided during construction. One of the two methods described above, 1 1/2" cold-rolled channel or horizontal strap bracing, should be installed immediately after the studs are erected to prevent stud failure.

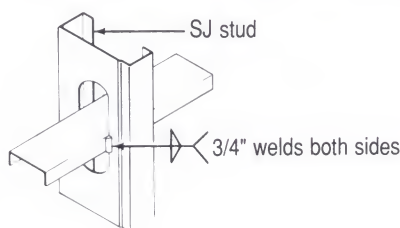
Lateral bracing weld attachment

(3 5/8" thru 8" members)



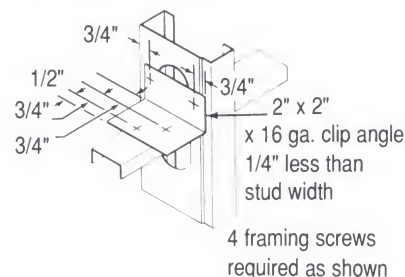
Lateral bracing weld attachment

(3 5/8" or smaller members in 16 ga. or heavier thickness) (3 5/8" thru 8" members)

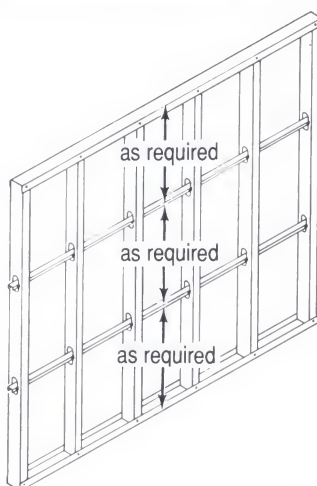
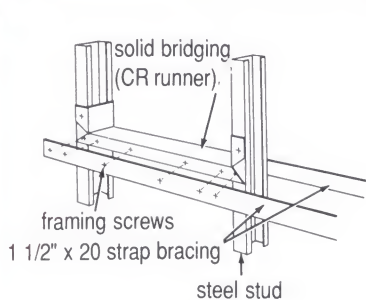


Lateral bracing screw attachment

(3 5/8" thru 8" members)



Solid bridging



Buildings must be properly braced to resist racking under wind and seismic loads. In steel framed construction, diagonal strap bracing offers an economical and effective means to provide this resistance. Straps are sloped to resist racking forces in tension. They are installed over framing members and easily covered with facing materials.

The ends of diagonal straps are readily secured by screws or welds to transfer the tension load to the wall

framing and floor assembly. End connections must be designed to transfer accumulated design loads. At the foundation, floor anchors must be adequate to prevent uplift and horizontal shear.

Diagonal bracing and connections must be designed for the specific conditions of a building. For allowable load capacities of Unimast members and assistance in developing connections, contact the Unimast Technical Departments

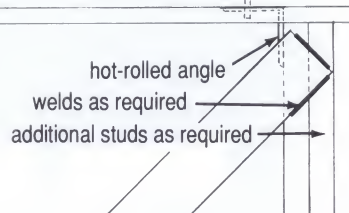
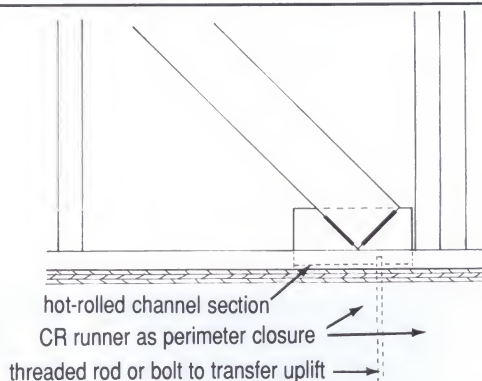
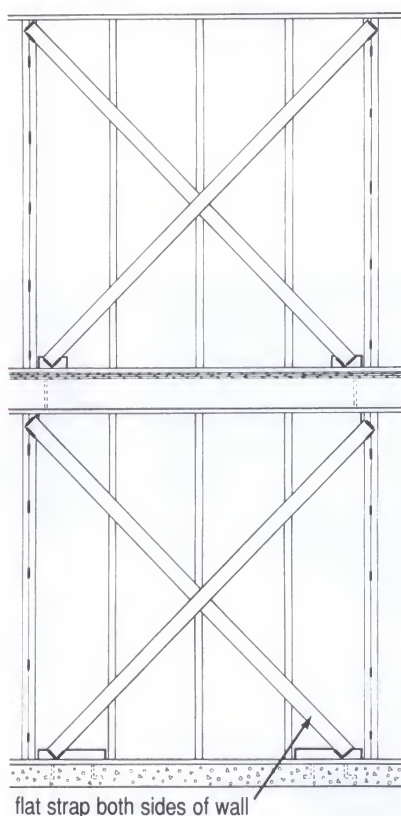
Table 34

Racking Bracing: Allowable Tension Capacity

Flat strap bracing (thickness)	Tension capacity (lb) ⁽¹⁾	Weld length (in) ⁽²⁾	1:1 slope (45°)	2:1 slope (63.5°)	
			Horizontal and vertical component (lbs)	Horizontal component (lbs)	Vertical component (lbs)
Flat strap bracing					
3"x14-ga. (.0697")	5,509	5¾	3,895	2,458	4,930
4"x14-ga. (.0697")	7,346	7½	5,194	3,278	6,574
5"x14-ga. (.0697")	9,182	9½	6,492	4,097	8,217
3"x16-ga. (.0548")	4,332	5¾	3,063	1,933	3,877
4"x16-ga. (.0548")	5,775	7½	4,083	2,577	4,625
5"x16-ga. (.0548")	7,219	9½	5,104	3,221	6,461

(1) Tension capacities based on steel having a design stress of 19.8 ksi. Yield strength (F_y) is 33 ksi. Ultimate strength of 35.64 ksi. Allowable stress increased 33% for wind and seismic loading. (2) Weld length is the minimum length of longitudinal fillet weld at each end of strap to develop tension capacity of strap.

Diagonal racking bracing

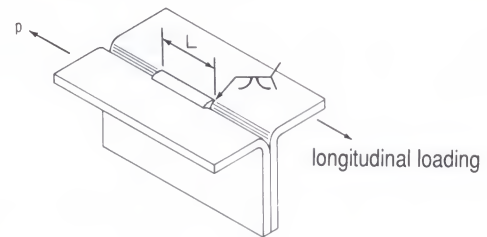
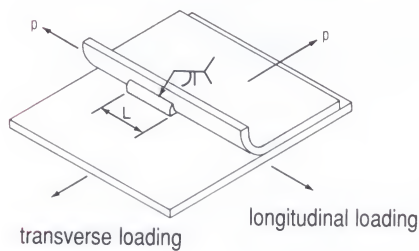
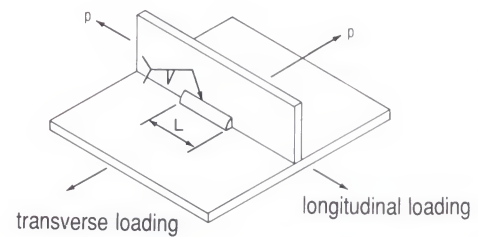
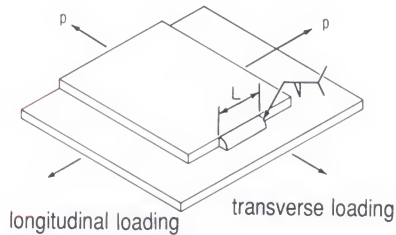


hot-rolled channel section anchored to foundation

Table 35**Welds: Allowable Loads (lb/in)⁽¹⁾**

Gauge ⁽²⁾	Design thickness (in)	Weld size (in)	Fillet		Flare bevel-groove		Flare v-groove
			Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal
20	.0344	$\frac{9}{32}$	368	490	368	408	368
18	.0478	$\frac{1}{8}$	511	681	511	568	511
16	.0598	$\frac{1}{8}$	640	853	640	710	640
14	.0747	$\frac{1}{8}$	799	1065	799	887	799
12	.1046	$\frac{1}{8}$	1118	1491	1118	1242	1118

(1) Loads based on steel having 33 ksi yield strength and 1.08 F_y tensile strength developed according to 1986 AISI Design Specifications and may be increased 33% for wind or seismic loads. When joining different gauge members, use load shown for lighter gauge. Loads are based on the thinnest metal in the attachment.

Flare-bevel groove weld**Flare V-groove weld****Lap joint fillet weld****T-joint fillet weld**

Field welding of light steel framing members.



Table 36

SUPER-TITE Screws: Allowable Loads (lbs/fastener)⁽¹⁾

Gauge ⁽²⁾ (thickness)	3/4" Driller HWH 80S (14 x 3/4)		5/8" Driller Pan Head 35S (10 x 5/8)		7/16" Driller Pan Head 23S (7 x 7/16)	
	Shear	Pullout	Shear	Pullout	Shear	Pullout
22 (.0299")	187	103	170	60	142	55
20 (.0344")	213	113	193	72	163	62
18 (.0478")	327	123	273	110	223	100
16 (.0598")	420	175	343	150	N/A ⁽³⁾	N/A ⁽³⁾
14 (.0747")	577	260	402	210	N/A ⁽³⁾	N/A ⁽³⁾

(1) Factor of safety of 3.0 used. Values based on steel having a 33 ksi yield strength. Values for other steels are directly proportional to yield strengths. Values for shear also apply to bearing. (2) Loads are based on the thinnest metal in the attachment. (3) N/A-two steel thicknesses of this gauge can not be connected by this size screw.

Table 37

Bulldex Screws: Allowable Loads (lbs/fastener)⁽¹⁾

Gauge ⁽²⁾ (thickness)	No. 1/4-14 D = .188" T = .205"		No. 12-14 D = .160" T = .177"		No. 10-16 D = .138" T = .153"		No. 8-18 D = .120" T = .125"		No. 6-20 D = .104" T = .106"	
	Shear	Pullout	Shear	Pullout	Shear	Pullout	Shear	Pullout	Shear	Pullout
20 (.0359")	154	71	143	71	141	69	140	68	133	53
18 (.0479")	301	101	276	101	263	98	248	94	188	83
16 (.0598")	426	159	377	153	261	151	236	142	N/A ⁽³⁾	N/A ⁽³⁾
14 (.0747")	511	242	412	215	286	205	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾
12 (.1046")	585	352	450	324	327	314	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾	N/A ⁽³⁾

(1) Allowable loads based on Bulldex Report #845. Loads based on steel having 33 ksi yield strength and 1.08 Fy tensile strength. Loads are based on average test results divided by a factor of safety of 3.0. These may be increased by 33% for wind and seismic loads. (2) Loads are based on the thinnest metal in the attachment. (3) N/A-two steel thicknesses of this gauge can not be connected by this size screw.

Table 38

Power Driven Fasteners in Concrete: Allowable Loads (lbs/fastener)⁽¹⁾

Shank diameter	Minimum penetration	Type of loading	Concrete compression strength (psi)		
			2000	3000	4000
0.145"	1 1/8"	Shear	160	225	265
		Pullout	90	115	145
0.177"	1 1/4"	Shear	250	285	330
		Pullout	150	205	275
0.205"	1 1/2"	Shear	390	445	500
		Pullout	220	280	345

(1) Values are for lightweight or hard rock concrete. Allowable shear and pullout values are based on Hilti ICBO Research Report #2388. Minimum fastener spacing is 4" o.c. and minimum edge distance is 3".

Table 39a

Power Driven Fasteners in Structural Steel: Allowable Bearing Capacity (lbs/fastener)⁽¹⁾

Shank diameter	Steel thickness				
	20 gauge (.0344")	18 gauge (.0478")	16 gauge (.0598")	14 gauge (.0747")	12 gauge (.1046")
0.145"	189	263	329	411	576
0.177"	231	321	402	502	702
0.205"	267	372	465	581	814

(1) Bearing capacity is based on Fu = 1.15 x 33.0 ksi. Allowable bearing capacity calculated per Section E 3.3 of the 1986 AISI Design Specifications.

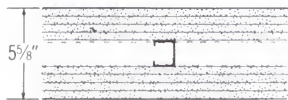
Table 39b

Power Driven Fasteners in Structural Steel: Allowable Pull-out and Shear (lbs/fastener)⁽¹⁾

Cold rolled steel gauge	0.145" Shank Diameter			0.177" Shank Diameter			0.205" Shank Diameter		
	Hot Rolled Steel Thickness			Hot Rolled Steel Thickness			Hot Rolled Steel Thickness		
	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"
12 (.1046")	210	210	210	335	395	395	485	525	660
14 (.0747")	210	210	210	335	395	395	485	525	581
16 (.0598")	210	210	210	335	395	395	465	465	465
18 (.0478")	210	210	210	321	321	321	372	372	372
20 (.0344")	197	197	197	241	241	241	279	279	279

(1) Shear values are based on Hilti ICBO Research Report No. 2388. Tests were conducted with the fastener point driven completely through the back side of the hot rolled steel member. This was necessary to obtain proper gripping force.

**4-Hour Rated Partitions
(Non-load Bearing)**

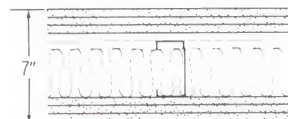


wt. 17

Unimast 1 5/8" Steel Stud 24" o.c.-4 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side-base layers applied vert-face layer applied horiz-panels screw attached w/joints stag & fin-perimeter caulked-rating based on assembly with or without SAFB's-rating also applies with IMPERIAL gypsum base, FIRECODE C core, and veneer finish surface-**UL Des U435**

62 STC Based on assembly with 1 1/2" SAFB's in cavity-**SA-830113**

**3-Hour Rated Partitions
(Non-load Bearing)**

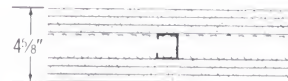


wt. 14

Unimast 35SJ20 studs 24" o.c. - RC-1 channel one side spaced 24" o.c. screw attached to studs-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-3" THERMAFIBER SAFB's-3 layers gypsum panels screw-attached to studs, 3 layers screw-attached to channels-panels applied vert with joints staggered-joints finished-perimeter caulked-**UL Des U455**

63 STC **RAL-TL-87-152** (58 MTC)

65 STC 60SJ20, 5" SAFB's, **RAL-TL-87-143** (61 MTC)

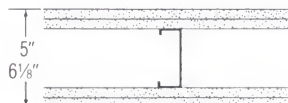


wt. 13

Unimast 1 5/8" Steel Stud 24" o.c.-3 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side-base layers applied vert-face layer applied horiz-panels screw attached with joints staggered & fin -perimeter caulked-rating based on assembly with or without SAFB's-rating also applies with IMPERIAL gypsum base, FIRECODE C core, and veneer finish surface-**UL DES U435**

59 STC Based on assembly with 1 1/2" SAFB's in cavity-**SA-830112**

**2-Hour Rated Partitions
(Non-load Bearing)**



wt. 12

Unimast 2 1/2" or 3 5/8" Steel Stud 24" o.c.-2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, plain or vinyl faced vert applied each side-base layer screw attached-face layer laminated or screw-attached-joints finished or unfinished-perimeter caulked-**UL Des U411**-rating also applies with plain panels horiz-**GA-WP-1548**

48 STC Based on 3 5/8" studs and 5/8" FIRE CODE "C" panels-**BBN-770408**

51 STC Based on 2 1/2" SAFB's in cavity-**GA-WP-1548**

56 STC Based on 2" SAFB's in cavity-**USG-840819**



wt. 9

Unimast 1 5/8" Steel Studs 24" o.c.-2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core-2 layers each side vert applied & screw-attached-joints finished-**U of C 6-15-65**

N/A



wt. 10

Unimast 2 1/2" or 3 5/8" Steel Studs 24" o.c.-2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side - 1", 1 1/2" or 2" THERMAFIBER SAFB's stapled-panels applied vert & joints staggered-base layer screw-attached - face layer strip laminated or screw-attached - joints finished-perim caulked-rating based on assembly with or without sound attenuation blankets-**UL Des U412**

50 STC Based on 3 5/8" stud assembly with out SAFB's-**USG-840817**

55 STC Based on 3 5/8" studs and 1 1/2" SAFB's-**SA-800421**

52 STC Based on lamin. face layer, 1 1/2" SAFB's and 2 1/2" studs-**SA-860932**

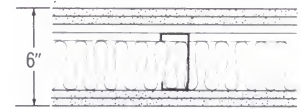
54 STC Based on 2 1/2" studs, screw-att face layer and 1 1/2" SAFB's-**CK-654-40**

Unimast 35SJ20 studs 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-3" THERMAFIBER SAFB's-RC-1 channel one side spaced 24" o.c. screw-attached to studs-2 layers gypsum panels screw-attached to channels, 2 layers screw-attached to studs-panels appl vert with joints staggered-joints fin-perimeter caulked-**UL-Des U454**

60 STC **RAL-TL-87-154** (54 MTC)

61 STC Based on 5/8" thick panels-**RAL-TL-83-214** (57 MTC)

2-Hour Rated Partitions (cont.) (Non-load Bearing)



wt. 10

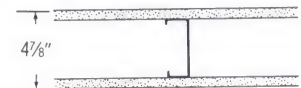
Unimast 3 5/8" Steel Studs 24" o.c.-5/8" SHEETROCK brand gypsum panels, FIRECODE core-single layer panels vert or horiz applied & screw-attached-joints staggered & finished-perimeter caulked-**UL Des U465**-based on panels horiz applied-**GA-WP-1200**

40 STC **USG-860808**

49 STC Based on 3" SAFB's in cavity panels **SA-870717**

51 STC Based on 3" SAFB's 25" wide, creased to fit cavity-**TL-85-128**

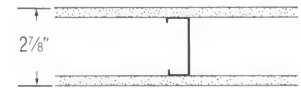
1-Hour Rated Partitions (Non-load Bearing)



wt. 6

Unimast 1 5/8" steel studs 24" o.c.-5/8" SHEETROCK brand gypsum panels, FIRECODE core-single layer panels vert applied & screw-attached 12" o.c.-joints fin-perimeter caulked-**U of C 7-31-62**

38 STC **USG-860809**



wt. 5

Unimast 2 1/2" steel studs 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-single layer panels each side applied vert & screw-attached-1 1/2" THERMAFIBER SAFB's-joints fin-perimeter caulked-**UL Des U448**

45 STC **TL-69-42**

48 STC Based on 3 5/8" studs & 2" SAFB's-**SA-800422**



wt. 5

Unimast 3 5/8" Steel Studs 24" o.c., 5/8" SHEETROCK brand gypsum panels, FIRECODE core-3" THERMAFIBER SAFB's 25" wide creased to fit cavity- RC-1 channels 24" o.c. screw-attached one side-panels vert applied & screw-attached-joints staggered & finished-perimeter caulked-**UL Des U451**

55 STC **SA-850415**

54 STC Based on 24" wide SAFB's-**USG-850409**

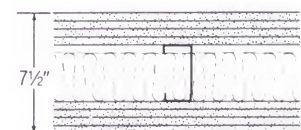


wt. 6

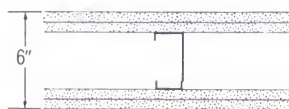
Unimast 35SJ20 studs 24 " o.c.-four layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, each side-1", 1 1/2", 2" or 3" THERMAFIBER SAFB's optional-base layers applied vert with joints staggered-base panels attached with Type S-12 screws 48" o.c.-face layer applied vert or horiz with 2 5/8" Type S-12 screws 12" o.c. and 1 1/2" Type G screws in panels-rating also applies with IMPERIAL gypsum base, FIRECODE C core, and veneer finish-**load bearing up to 100% allowable stud axial load-UL Des U426**

N/A

3-Hour Rated Partitions (Load Bearing)



wt. 18

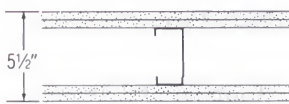
**2-Hour Rated Partitions
(Load Bearing)**

wt. 10

Unimast 35SJ20 studs 24" o.c.-Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE core-panels applied vert-base layer attached with 1" Type S-12 screws 12" o.c.-face layer attached with 1 5/8" Type S-12 12" o.c.-joints finished-load bearing up to 80% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 5/8" SHEETROCK brand gypsum sheathing, FIRECODE core, on exterior.)

48 STC Based on 2" SAFB's in cavity-USG-811006

49 STC Based on 2" SAFB's and 60SJ20 stud-USG-810937

**1 1/2-Hour Rated Partitions
(Load Bearing)**

wt. 9

Unimast 35SJ20 studs 24" o.c.-Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core-panels applied vert-base layer attached with 1" Type S-12 screws 12" o.c.-face layer att with 1 5/8" Type S-12 screws 12" o.c. - joints fin-load bearing up to 100% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, on exterior.)

49 STC Based on 2" SAFB-USG-811009

49 STC Based on 2" SAFB's and 60SJ20 studs-USG-810940

**1-Hour Rated Partitions
(Load Bearing)**

wt. 6

Unimast 35SJ20 studs 24" o.c.-5/8" SHEETROCK brand gypsum panels, FIRECODE core-panels applied vert & attached with 1" Type S-12 screw 12" o.c.-joints finished-load bearing up to 100% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 5/8" SHEETROCK gypsum sheathing, FIRECODE core, on exterior.)

40 STC USG-810519

41 STC Based on 2" SAFB's in cavity-USG-810518



wt. 10

Unimast 35SJ20 studs 24" o.c.-Dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core-1", 1 1/2", 2" or 3" THERMA-FIBER SAFB's-RC-1 channels one side spaced 24" o.c. screw-attached to studs-panels applied vert with joints staggered-base layer attached with 1" Type S-12 screws 12" o.c.-face layer attached with 1 5/8" Type S-12 screws 12" o.c.-joints finished-rating also applies with IMPERIAL gypsum base, FIRECODE C core and veneer finish surface-load bearing up to 100% allowable stud axial load-UL Des U440

61 STC Based on 35SJ16 studs, 5/8" panels, lateral bracing and 3" SAFB's in cavity-SA-830628

51 STC Based on 35SJ16 studs and lateral bracing-SA-840715

**45-Minute Rated Partitions
(Load Bearing)**

wt. 6

Unimast 35SJ20 studs 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-panels applied vert & attached with 1" Type S-12 screws 12" o.c.-joints finished-load bearing up to 100% allowable stud axial load-UL Des U425: (For exterior wall, use dbl layer 1/2" SHEETROCK brand gypsum sheathing, FIRECODE core, on exterior.)

47 STC Based on 3" SAFB's in cavity-SA-861001

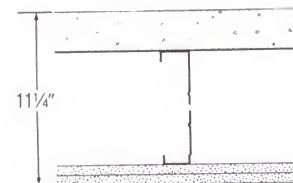
Unimast 75SJ18 steel joists 24" o.c.-2 1/2" concrete floor over corrug steel deck-dbl layer 5/8" SHEETROCK brand gypsum panel, FIRECODE C core, ceiling-base panels attached with 1" Type S-12 screws 12" o.c.-face panels attached with 1 7/8" Type S-12 screws 12" o.c.-joints staggered and finished-estimated rating based on witnessed laboratory test.

44 STC **KAL-443533**

73 IIC Based on carpet and pad-**KAL-443680**

47 STC Based on USG RC-1 channel 24" o.c.-**KAL-443534**

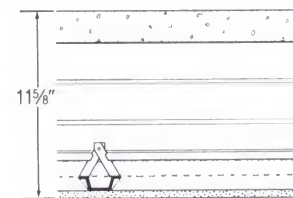
2-Hour Rated Ceilings



clg. wt. 5

Unimast 725SJ18 steel joists 24" o.c.-1/2" SHEETROCK brand gypsum panels, FIRECODE C core-2" concrete over corrug steel deck-drywall furring channel 24" o.c. clip - attached to joist-1" THERMAFIBER insulation laid over channel below joists-panels screw-attached to channels 12" o.c.-joints finished-UL Des G533

N/A



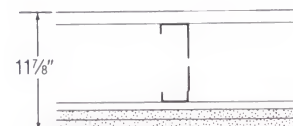
clg. wt. 3

Unimast 95SJ16 steel joists 24" o.c.-3/4" T&G plywood flr attached to joists with Type S-12 screws 24" o.c.-dbl layer 5/8" SHEETROCK brand gypsum panel, FIRECODE C core, ceiling attached to RC-1 channel screw attached to joist 16" o.c.-base panels attached with 1" Type S-12 screws 24" o.c.-face panels attached with 1 5/8" Type G screws 8" o.c. at butt joints, 1 5/8" Type S crews 12" o.c. in field-joints finished-UL Des L527

48 STC **USG-771101**

51 STC Based on carpet & pad-**SA-781110**

1 1/2-Hour Rated Ceilings



clg. wt. 5

Unimast 725SJ18 steel joists 24" o.c.-dbl layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling and 5/8" T&G plywood flr attached to joists with Type S-12 screws-dbl layer gypsum panels around beam-joints exp-includes unrestrained beam-UL Des L524

39 STC Based on 95SJ16 joists-**USG-760105**

43 STC Based on 95SJ16 joists and 3" SAFB's-**USG-760310**

56 IIC Based on 95SJ16 joists and carpet & pad-**USG-760106**

60 IIC Based on 95SJ16 joists and carpet & pad with 3" SAFB's-**USG-760405** (insulation may affect fire rating)

1-Hour Rated Ceilings



clg. wt. 3

Unimast 75SJ18 steel joists 24" o.c.-2 1/2" concrete flr on corrug steel deck-5/8" SHEETROCK brand gypsum panels, FIRECODE C core, attached to joists with 1" Type S-12 screws 12" o.c.- joints fin-estimated fire rating based on witnessed laboratory test

45 STC Based on USG RC-1 resilient channels 24" o.c.-**KAL-443536**

70 IIC Based on carpet & pad-**KAL-443535**



clg. wt. 3

These pages do not include all of the fire and sound rated steel framing systems which were tested with Unimast Incorporated's steel framing. For additional systems, including plaster assemblies, column applications and chase wall systems, see U.S. Gypsum's "Construction Selector", SA-100 (Sweet's 09200).

1.0 General

2.0 Products

2.1 Materials

2.1.1 All studs and/or joists and accessories shall be made of the type, size, gauge and spacing shown on the drawings, and shall be manufactured by Unimast Incorporated.

2.1.2 All structural members shall be designed in accordance with American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members," 1986 edition.

2.1.3 All structural members shall be formed from corrosion-resistant steel, corresponding to the requirements of ASTM A446, with a minimum yield strength of 40 ksi (50 ksi) (33 ksi) for SJ studs and Grade A, 33 ksi, for CR runners.

2.1.4 All structural members shall be zinc coated meeting ASTM A525.

3.0 Execution

3.1 Fabrication

3.1.1 Prior to fabrication of framing, the contractor shall submit fabrication and erection drawings to the architect or engineer to obtain approval.

3.1.2 Prefabricated panels shall be square, with components attached in a manner to prevent racking and to minimize distortion while lifting and transporting.

3.1.3 All framing components shall be cut squarely for attachment to perpendicular members or, as required, for an angular fit against abutting members.

3.1.4 All framing components shall be plumbed, aligned and leveled.

3.1.5 In all doubled jamb studs and doubled headers not accessible to insulation contractors, insulation equal to that specified elsewhere shall be provided.

3.1.6 Fastening of components shall be with self-drilling screws or welding. Screws and welds shall be of sufficient size to ensure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched-up with a zinc-rich paint.

3.1.7 Splices in framing components, other than runner track, shall not be permitted.

3.1.8 Abutting lengths of runner shall be butt-welded, spliced or each length securely anchored to a common structural element.

Runners shall be securely anchored to the supporting structure as shown on the drawings.

3.1.9 Temporary bracing, where required, shall be provided until erection is complete.

3.2 Installation

(non-load bearing curtain walls)

3.2.1 Studs shall be secured to continuous runner tracks unless the stud end terminates at deflection track.

3.2.2 Installation of curtain wall framing shall accommodate vertical displacement of () of the primary frame. This shall include slide clips and deflection slip tracks as shown on the drawings.

3.2.3 Framing of wall openings shall include headers and jambs as shown on the drawings.

3.3 Installation (axial load bearing walls)

3.3.1 Axially loaded studs shall be installed so the ends are positioned against the inside of the runner track web prior to fastening and shall be attached to both flanges of the upper and lower runner tracks.

3.3.2 Complete, uniform and level bearing support shall be provided for the bottom runner.

3.3.3 Framing of wall openings shall include headers and supporting studs as shown on the drawings.

3.3.4 Resistance to bending and rotation about the minor axis shall be provided by horizontal strap and blocking or cold-rolled channel bracing as shown on the drawings.

3.3.5 Diagonally braced stud walls, as indicated on the drawings, shall be provided at locations designated as "shear walls" for frame stability and lateral load resistance. Additional studs, when necessary, shall be positioned as indicated on the drawings and adequately attached to the structure to resist the vertical components of the loads.

3.4 Installation (joists)

3.4.1 Uniform and level joist bearing shall be provided at the foundation walls by means of shims and/or non-settling grout.

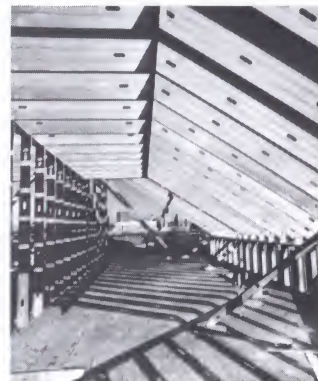
3.4.2 Joists shall be located directly over bearing studs, or a load distribution member shall be provided at the top of the bearing wall.

3.4.3 Web stiffeners shall be provided at reaction points and/or at points of concentrated loads where indicated on the drawings.

3.4.4 Joist bridging shall be provided where indicated on the drawings.

3.4.5 Additional joists shall be provided under parallel partitions when the partition length exceeds one-half the joist span, and around all floor and roof openings which interrupt one or more spanning members, unless otherwise noted.

3.4.6 End blocking shall be provided where joist ends are not otherwise restrained from rotation.



Design requirements are easily met with steel framing.

Calculations for both stud and joist tabular data in this publication are based on the following factors:

1. AISI "Specifications for the Design of Cold-Formed Steel Structural Members", 1986 edition.
2. Yield strength: 40,000 psi (40 ksi) for SJ studs, 33,000 psi (33 ksi) for CR runners and SN and ST studs. (Contact the Technical Service Department nearest you for information on 33 ksi and 50 ksi SJ studs.)
3. Structural and physical properties of members shown in Tables 2-9.

Joists

Conditions considered especially for joist allowable clear span and load tables (Tables 10 and 11) include:

1. Bending stress
2. Shear stress
3. Combined bending and shear stress
4. Web crippling
5. Combined bending and web crippling
6. Deflection

Calculations for joists also are based on:

- A. Joist compression flange fully braced.
- B. Minimum of 10" unpunched steel at the end supports.
- C. Double-span systems assume screw-attached joist reinforcement for a minimum distance of 0.1 span each side (total 0.2 span) of center support.

Studs

Conditions considered especially for stud axial and wind load tables (Tables 18-25) include:

1. Bending stress
2. Axial stress
3. Combined axial and bending stress
4. Shear stress
5. Wind load deflection including effect of axial load
6. Web crippling at supports
7. Slenderness ratio, not to exceed 300 for construction loads only (no lateral loads)
8. Slenderness ratio not to exceed 200 for laterally loaded studs and combined loaded studs (axial and lateral loads)

Calculations for studs also are based on:

- A. Lateral bracing provided by cold-rolled channels or horizontal straps spaced a maximum of 48" o.c. for axially loaded studs and by gypsum board or sheathing each side for laterally loaded studs only.

B. Actual bending and axial stresses on studs multiplied by .75 in accordance with AISI Section A4.4.

C. Web crippling based on test data for studs with minimum 10" unpunched steel at both ends of member; for 20 and 18-gauge studs having 20 and 18-gauge runner, respectively; and for 16 and 14-gauge studs using a minimum of 18-gauge runner. Web stiffening may be required when field cuts reduce this minimum 10" unpunched steel.

Product Availability

Unimast products are available from from local United States Gypsum Company sales representatives and can be ordered through Unimast sales offices shown on back cover.

All products may not be available from all Unimast plant locations. Contact the sales office nearest you for specific product availability.

Literature

Unimast Incorporated product catalogs are available from Unimast sales offices. Contact the one nearest you for any of the following literature:

- | | |
|-------|---------------------------------------------------------------------------------------------|
| CS-13 | Steel Framing Components and Accessories for Drywall, Plaster and Load-bearing Construction |
| UN-29 | Certification of Material |
| UN-30 | Steel Framing Systems—Product and Technical Information |
| UN-31 | Plastering Steel Products and Accessories |
| UN-32 | Drywall Steel Products and Accessories |
| UN-4 | Unimast Incorporated |

Unimast products also are included in literature published by United States Gypsum Company. The following catalogs are available from U.S. Gypsum sales offices:

- | | |
|--------|-------------------------------------------|
| SA-100 | USG Construction Selector |
| SA-920 | Plaster Products, Accessories and Systems |
| SA-923 | Drywall/Steel Framed Systems |

Product and system design information is also available in Sweet's Catalog sections 09200, 09250 and 05400.



Sales Offices

Boonton, New Jersey
 Fax: 201-402-5247
 Plant: 201-335-3240
 In State: 800-334-0665
 Out of State: 800-524-0712

Corona, California
 Fax: 714-279-4613
 Plant: 714-279-3300
 Out of A/C: 800-347-3303

Franklin Park, Illinois
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 Plant: 708-451-1410
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 Out of State: 800-323-0746

Mansfield, Texas
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 Plant: 817-473-9346
 In State: 817-473-9346
 Out of State: 800-628-5170

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 Plant: 404-961-4110
 In State: 404-961-4110
 Out of State: 800-631-6287

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 Plant: 216-372-4014
 In State: 800-362-7964
 Out of State: 800-241-7085

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Midwest and Northeast
 Fax: 708-451-1328
 800-654-STUD
 708-451-1410

South and West
 Fax: 404-961-8455
 404-961-4110

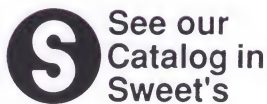
Unimast Incorporated
 9595 Grand Avenue
 Franklin Park, IL 60131



Member: Association of the Wall
 and Ceiling Industries International



Member: Metal Lath/Steel
 Framing Association



See our
 Catalog in
 Sweet's

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Unimast Incorporated acknowledges Professor Karl H. Klippstein, P.E., University of Pittsburgh, Structural Engineering Consultant, and Matsen Ford Design Associates, Inc., Pewaukee, Wisconsin, and Baltimore, Maryland, for assistance in preparing the technical information.

All details, specifications and data computations contained in this literature are intended as a general guide for use in construction. These products must not be used in the design or construction of any structure without complete and detailed evaluation by a qualified engineer or architect to verify the suitability of these particular products for use in any given structure. Because physical properties among competitive products vary, information from this publication should be used only with Unimast studs and runners. Unimast Incorporated assumes no liability for failure resulting from the use of its drawings, specifications or computations or for failure resulting from the use of alternative materials or improper application or installation.

DUROCK Exterior Cement Board Systems



For many applications:

- Ceilings & soffits
- Bearing walls
- Pool enclosures
- Curtain walls
- Panelization
- Fences & signs

With a wide variety of beautiful finishes:

- Stucco
- Thin brick
- Thin stone tile
- Ceramic tile
- Stone aggregate
- EIFS





on the cover

Residence, Goose Pimple Junction, Virginia

inside front cover

Residence, Jacksonville, Florida, above left

Universal Studios Florida, Orlando, Florida, above right

Residence, Jacksonville, Florida

Attractive, Efficient Exteriors Engineered for High Performance

DUROCK Exterior Cement Board Systems offer architects and builders lightweight, fire-resistant assemblies for steel-framed and wood-framed exteriors. Utilizing conventional materials, methods and equipment, these high-performance systems are suitable for many types of structures. Specially formulated DUROCK Exterior Cement Board and DUROCK RB are readily attached to wood or steel framing spaced max. 16" o.c. Large-size panels are nailed or screwed to wood studs and screw-attached to steel studs. DUROCK Exterior Cement Board and DUROCK RB serve as a base for ceramic tile, thin brick, epoxy matrix stone aggregate surfacing and DUROCK Exterior Basecoat and Finish. In addition, the boards may serve as the sheathing in exterior insulation and finish systems (EIFS).

DUROCK Cement Board, formed in a continuous process, consists of an aggregated portland cement core reinforced with polymer-coated, glass-fiber mesh embedded in both surfaces. Boards are made 1/2" thick and 32" or 48" wide, cut to 8' lengths, and cured before shipment. Other sizes are available on special order. Ends are square cut and edges reinforced and finished smooth.

Tested System Performance

DUROCK Exterior Cement Board Systems secured to steel studs or wood studs were extensively in-house and independent laboratory tested. Deformation under compressive and flexural loads, water permeance, cyclic freezing and thawing, wetting and drying were analyzed.

See National Evaluation Service Report No. 396 for allowable values and/or conditions of use concerning material presented in this document. It is subject to reexamination, revisions and possible changes.

DUROCK Exterior Systems with tile and thin brick meet the requirements of the Ceramic Tile Institute and are included in its Tested Material List.

**TESTED
MATERIAL**



LISTED 34L2
**For floor protectors
and wall shields.**

Benefits

Design Freedom—These systems provide a wide choice of architectural style, color and texture, while minimizing variance of cost and performance. Surface versatility, material economy and conventional application techniques make these systems ideal for many structures: light commercial (office buildings, hotels, motels, stores and shopping centers); institutional (schools, clinics, hospitals and nursing homes); residential (apartments, townhouses and homes); and industrial buildings (factories and warehouses).

Versatile Applications—DUROCK Systems adapt easily to basic design concepts. The same substrate can be used for ceramic or thin cut stone tile, thin brick, stone aggregate, EIFS, and DUROCK Exterior Finish, either in combination or on different faces of the building.

- Ceilings and Soffits—large or small areas including curves and boxed beams.
- Curtain Walls—spandrel or in-fill panels including sloped sills, mechanical enclosures and parapets.
- Bearing Walls—residential or commercial, wood or steel framing.
- Panelization—adaptable to factory or jobsite fabrication including finished modular units.
- Swimming Pool Enclosures—walls and ceilings, color and texture may be varied to contrast or complement glass and other exterior materials.
- Fences and Signs—stucco finish used with ceramic tile or fiber optic lighting to create unique designs.

Superior Performance—DUROCK Exterior Cement Board systems

are weather-resistant, withstand high temperature, humidity, water, wind, and repeated freeze-thaw cycles. The board provides a strong, durable substrate for thin brick, tile, stone aggregate, DUROCK Exterior Finish and EIFS. DUROCK Cement Board is an excellent sheathing for use in EIFS because, unlike gypsum board, it will not soften or delaminate after prolonged exposure to moisture. See *CB-269 DUROCK Exterior Insulation and Finish System* for details.

Fire Resistance—Both 1- and 2-hour fire-resistance ratings are achieved with wood or steel studs. See table, page 5, for fire-rated assemblies.

Lightweight—These systems provide a similar appearance but weigh considerably less than masonry or precast or poured concrete, reducing structural foundation requirements.

Detailing—Layering DUROCK Exterior Cement Board can provide esthetic detailing with design options such as quoins, lintels, dentils, banding and keystones. Fabrication may be in single or double layer.

Low In-Place Cost—Labor time required and installed cost are less than many other exterior systems. Large 32" or 48" wide by 8' panels install easily with nails or screws. Buildings can be closed-in quickly, allowing interior construction to proceed.

Warranty—All DUROCK Exterior Cement Board System products manufactured by United States Gypsum Company are warranted to be free from defects in material and workmanship. DUROCK Exterior Cement Board Systems are backed by a comprehensive 10-year Limited Warranty. Contact United States Gypsum Company for complete details.

Framing Systems

Wood Framing—Load-bearing or non-load bearing construction is provided with conventional wood studs spaced 16" o.c. max.

Steel Framing—Load-bearing or non-load bearing construction is provided with 20-ga. or heavier steel studs or channels, with corrosion-resistant coating equivalent to G60 hot dipped galvanized, spaced a maximum 16" o.c. Refer to *SA-923, Drywall/Steel-Framed Systems*, for information on steel framing.

Insulation

For increased thermal resistance and sound attenuation, THERMAFIBER FS-15 Insulation or SAFB blankets may be inserted into the wall cavity. These products may be required in listed fire-rated assemblies.



Residence, Mobile, Alabama

Exterior Surfaces

Ceramic tile, thin brick, stone aggregate set in an epoxy matrix, DUROCK Exterior Finish or EIFS may be used as the exterior facing, as described below:

For all DUROCK Exterior Cement Board Systems

- An approved water barrier, installed over the framing or stapled to back of DUROCK Exterior Cement Board.
- DUROCK Exterior Cement Board, attached to steel framing using DUROCK Steel Screws, or to wood framing using DUROCK Wood Screws or hot-dipped galvanized roofing nails.
- DUROCK Exterior Tape, embedded over all panel joints.

For Tile and Thin Brick Systems

- DUROCK Latex Fortified Mortar applied $\frac{1}{8}$ " thick over the entire DUROCK Exterior Cement Board surface.
- DUROCK Latex Fortified Mortar applied as the bond coat for ceramic tile and thin brick; and DUROCK Latex Fortified Grout used to fill joints between units.

For Exposed Aggregate Systems

- Epoxy matrix finish with stone aggregate applied over the entire DUROCK Exterior Cement Board surface.

Consult manufacturer of ceramic tile, thin brick and aggregated epoxy matrix to determine its suitability as an exterior surface and to obtain complete application instructions.

For DUROCK Exterior Finish System

- DUROCK Exterior Basecoat, applied over DUROCK Exterior Cement Board according to directions.
- DUROCK Exterior Finish coat, ready-mixed for application over DUROCK Exterior Basecoat according to directions. It can be applied or finished in any of many common textures. Quoins, dentils, keystones, or other architectural elements can be installed over basecoated DUROCK Exterior Cement Board and decorated with DUROCK Exterior Finish.



a



b



c

a. Cement board is applied to framing with DUROCK Screws or hot-dipped galvanized roofing nails.

b. Basecoat is applied over entire area, including treated joints.

c. Exterior finish is applied after basecoat has cured for 24 hours.

For DUROCK Exterior Insulation and Finish Systems (EIFS)

- Follow the design and application recommendations provided in the DUROCK Exterior Insulation and Finish system brochure CB-269 or the recommendations of the EIFS manufacturer. When applying

insulation board to DUROCK Exterior Cement Board, always use the full bond method.

Interior Surfaces

Gypsum drywall, high-strength veneer plaster on gypsum base or ceramic tile applied to DUROCK Interior Cement Board may be used as the interior surface. For application of DUROCK Interior or Exterior Cement Board on interiors, see technical folder SA-932 in this series and in Sweet's General Building and Homebuilding Files. Technical assistance and consultation from experienced technical representatives are available. See back cover for phone numbers.

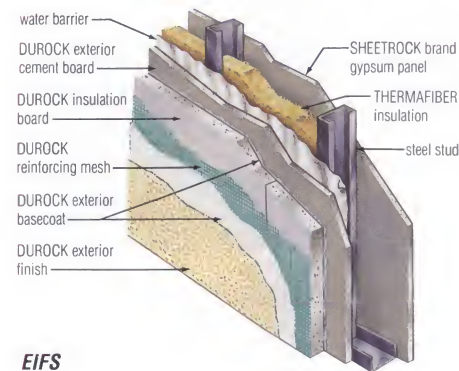
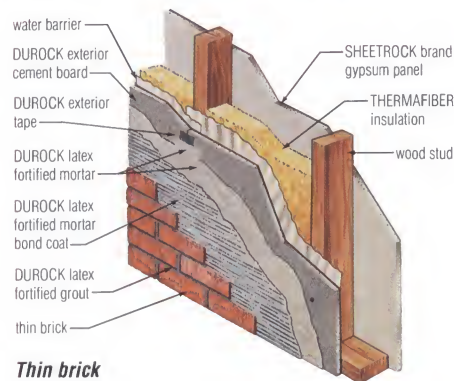
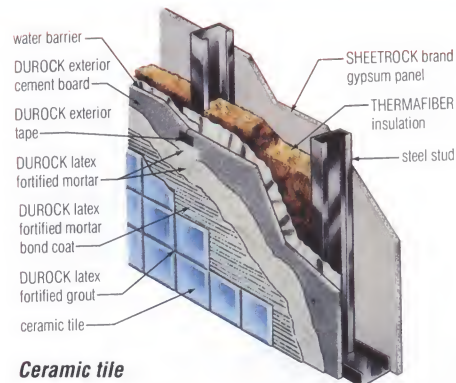
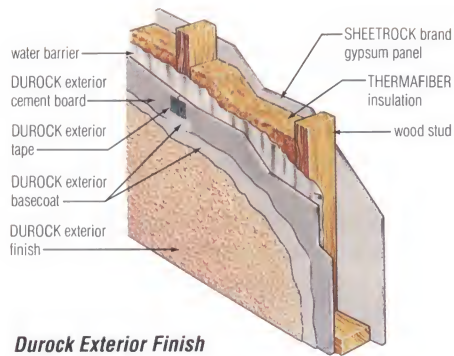
Limitations

- 1 Systems using DUROCK Exterior Cement Board are designed for positive or negative uniform loads of up to 40 psf with studs spaced 16" o.c. max. Systems using DUROCK RB are designed for positive or negative uniform loads up to 30 psf with studs spaced 16" o.c. max. For 40 psf loading space screws max. 8" o.c., for southern pine space 1 $\frac{1}{2}$ " nails 8" o.c., 4 o.c. for spruce-pine-fir; 6" o.c. for 30 psf on spruce-pine-fir.
- 2 Maximum stud spacing: 16" o.c. for exterior wall assemblies, 24" o.c. for cavity shaft wall assembly; maximum allowable for deflection, based on stud properties only, L/360 for tile and thin brick finishes, L/240 for DUROCK Exterior Finish and DUROCK EIFS.
- 3 DUROCK Exterior Systems finished with ceramic tile, thin brick, epoxy matrix stone aggregate, DUROCK Exterior Finish and DUROCK EIFS may be used on sills sloped a minimum of 10 degrees and up to 2'0" deep provided that the framing is 16" o.c., $\frac{1}{2}$ " minimum structural sheathing is placed behind the DUROCK Exterior Cement Board, and the installation is adequately caulked, flashed and waterproofed.
- 4 DUROCK Exterior Cement Board may not be used as a structural sheathing-for racking resistance, separate bracing must be specified.

Note: Consult your local United States Gypsum Company Technical Representative for applications and details beyond the scope of this technical literature.



Exchange Linen Building, Santa Rosa, California

**1-Hour Walls****Wood-Framed/Load Bearing**
THERMAFIBER Insulation

Detail/Physical Data	Description	Fire Test	Reference
	<p>1/2" DUROCK exterior cement board and 1/2" ceramic tile exterior—board attached with 1 1/2" DUROCK wood screws or 1 1/2" hot dipped galvanized roofing nails 8" o.c.—2x4 studs spaced 16" o.c.—3/4" THERMAFIBER FS-15 insulation between studs—1/2" SHEETROCK brand gypsum panels, FIRECODE core, or IMPERIAL FIRECODE gypsum base and 1/4" IMPERIAL finish interior</p>	UL Des U329	A

Steel-Framed/Load Bearing

	<p>1/2" DUROCK exterior cement board—base layer 1/2" SHEETROCK brand gypsum panels, water-resistant, FIRECODE core—3/4" 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK steel screws 8" o.c.—joints taped—1/2" SHEETROCK brand gypsum panels, FIRECODE core, interior</p>	UL Des U473	B
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Steel-Framed/Non-Load Bearing

	<p>1/2" DUROCK exterior cement board and 1/2" ceramic tile exterior—board screw-attached with 1 1/2" DUROCK steel screws 8" o.c. to 3/4" min., 20-ga. min. studs spaced 16" o.c.—3" THERMAFIBER SAFB insulation between studs—1/2" SHEETROCK brand gypsum panels, FIRECODE core, or IMPERIAL FIRECODE gypsum base and 1/4" IMPERIAL finish interior</p>	UL Des U442	C
	<p>1/2" DUROCK exterior cement board—3/4" min., 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board screw-attached with 1 1/2" DUROCK steel screws 8" o.c.—joints taped—1/2" SHEETROCK brand gypsum panels, FIRECODE C core</p>	UL Des U457	D
	<p>1/2" DUROCK exterior cement board—1 1/2" min., 20-ga. min. studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board screw-attached with 1 1/2" DUROCK steel screws 8" o.c.—joints taped—1/2" SHEETROCK brand gypsum panels, FIRECODE C core</p>	UL Des U458	E

2-Hour Walls**Steel-Framed/Non-Load Bearing**

	<p>Cavity Shaft Wall—1/2" DUROCK exterior cement board—1/2" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20-ga. min studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 1/2" DUROCK steel screws at 8" o.c. & laminated to gypsum panel with 4" strip ceramic tile mastic applied with 1/2" notched trowel midway betw studs—joints fin</p>	UL Des U459	F
	<p>1/2" DUROCK exterior cement board—base layer 1/2" SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core, both sides—3/4" 20-ga. min. studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK steel screws 8" o.c.—joints taped—alt. design double-layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior</p>	UL Des U474	G

Fine Finish—Spanish

Trowel on a smooth first coat. Apply a second coat using random, overlapping trowel strokes.

**Coarse Finish—Float**

Trowel on finish allowing aggregate to act as thickness gauge. Remove excess material. Float surface to achieve desired texture with plastic or wood float.

**Fine Finish—Lace**

Trowel on a first coat. Before surface moisture leaves, skip-trowel on second coat with trowel held flat. If desired, knock down finish with trowel.

**Fine Finish—Sandstone**

Trowel on finish allowing aggregate to act as thickness gauge. Using a plastic or wood float, float surface to achieve desired texture.

**Spray Application**

Finish may be spray-applied for a variety of desired textures.

**Long-Lasting, Textured Finish for Exterior Walls**

DUROCK Exterior Finish is a durable, stucco finish that is used in conjunction with DUROCK Exterior Cement Board and is applied directly over DUROCK Exterior Basecoat material. DUROCK Exterior Finish comes in 33 standard colors and is fade and weather resistant. Custom colors are available on special order. Numerous textures can be created using conventional stucco tools and application techniques.

This texture coating is based on a 100% acrylic polymer emulsion. DUROCK Exterior Finish is flexible and accommodates thermal expansion and contraction without cracking or delamination under normal conditions.

Installation time can be as little as 2 days with board erection, joint treatment, and basecoat application done on the first day. Installation begins with application of a required water barrier. Over the water barrier, DUROCK Exterior Cement Board is applied vertically or horizontally with DUROCK Screws or hot-dipped galvanized roofing nails spaced a maximum of 8" o.c. Prefill joints with DUROCK Exterior Basecoat; then embed 4" tape and level the joints. As an option, DUROCK Exterior Tape is applied over the joints and then DUROCK Exterior Basecoat is forced through the tape to completely fill and level the joints. This may require several passes. The treated joints must cure for a minimum of 4 hours. Next, DUROCK Exterior Basecoat is applied over the entire board area to provide a smooth uniform surface. After a 24-hour cure time, DUROCK Exterior Finish is applied to provide the desired texture.

Benefits

Design Freedom—33 standard colors in two finishes (coarse and fine) plus numerous specialty colors offer many texture possibilities. Color and texture can be varied to contrast or complement glass and other exterior materials. Can be used in combination with ceramic tile, thin brick and stone aggregate finishes on the same base.

Two-day System—DUROCK Exterior Finish allows quicker occupancy, reduces labor and installed costs.

Superior Durability and Performance—Long lasting. Withstands high temperatures, humidity, water, wind, and repeated freeze-thaw cycles. Expands and contracts to accommodate thermal expansion and contraction of the substrate under normal conditions.



Dupont Gardens Apartments, Jacksonville, Florida

Beautiful Colors to Meet Your Design Requirements

The 33 standard colors shown here offer a spectrum of choices. But they are only the beginning. DUROCK Exterior Finish is available in custom colors mixed to match the requirements of almost any job, providing you with freedom of expression in all your designs.


White

Cloud

Gray

Canyon

Desert

Malt

Mesa

Cocoa

Acorn

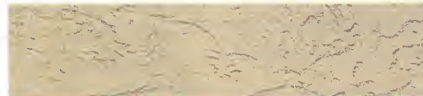
Sienna

Terra Cotta

Buff

Yuma

Sunflower

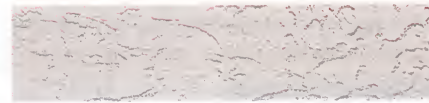
Savannah

Celadon

Mesquite

Sequoia

Cortez Gold

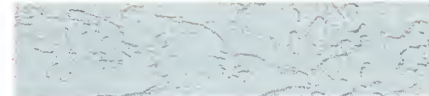
Zinc

Colonial Blue

White Sand

Smoke

Rose

Coral

Sunrise

Mint

Blue Frost

Dove Gray

Cognac

Taupe

Driftwood

Wedgewood Blue

Notice: These color reproductions show colors as closely as possible within printing limitations. For a more representative match to actual production material, see product samples offered by your sales representative.

Various textures may appear different in color due to shadowing effects.

DUROCK RB and DUROCK Exterior Cement Board

Material: Aggregated portland cement board with polymer-coated, glass-fiber mesh embedded in back and front surfaces.

Edges: Formed, smooth, reinforced.

Ends: Square cut.

Weight: Approx. 3 psf for 1/2" thickness.

Packaging: Shipped palletized, 20 or 30 sheets per pallet. Each pallet is stretch-wrapped and identified with pallet labels.

Sizes and Packaging

Type	Thickness		Width		Length		Ship Units
	Standard	Custom ⁽¹⁾	Standard	Custom ⁽¹⁾	Standard	Custom ⁽¹⁾	
RB	1/2"	—	32"	—	8'	4' to 8'	30
Exterior	1/2"	3/8"	48"	32"	8'	4' to 10'	20

(1) Minimum quantity required for custom sizes.

(2) Stretch-wrapped and shipped in packaging units as shown.

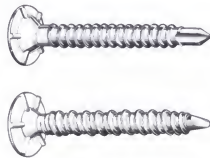
DUROCK Wood and Steel Screws

Developed especially for use with DUROCK Cement Boards. Wafer head design with countersinking ribs allows flush seating while preventing stripouts. Increased bearing surface provides greater push-off resistance. Neat, flush appearance makes finish material application easier. Special coating provides corrosion resistance superior to cadmium plating or zinc.

For 14 to 20-ga. Steel Framing: 1 1/4" and 1 5/8" DUROCK Steel Screws, Wafer Head, anticorrosive coating.

For Wood Framing: 1 1/4", 1 5/8" or 2 1/4" DUROCK Wood Screws, Wafer Head, anticorrosive coating.

Packaging: 1 1/4" screws, 5,000 pieces per carton; 1 5/8" screws, 4,000 pieces per carton; 2 1/4" screws, 2,000 pieces per carton.



DUROCK Exterior Tape

Material: polymer-coated, open mesh, glass-fiber tape.

Packaging: 4 rolls per carton, 150 linear ft./roll, 4" wide.

DUROCK Latex Fortified Mortar

Material: ready-to-mix, thin-set mortar containing dry latex polymers, white or gray.

Approximate Coverage: For thin brick and tile systems: approximately 40-50 ft.²/50 lb. bag for 1/8" thick leveling/skim coat; approximately 80-90 ft.²/50 lb. bag for bond coat (back buttering not included).

Packaging: 50 lb. bags.



DUROCK Latex Fortified Grout

Material: ready-to-mix grout containing dry latex polymers, Designer White or Natural Gray. Custom colors available.

Approximate Coverage: For tile systems: approximately 60-80 ft.²/50 lb. bag for 1/2" x 6" x 6" tile with 3/8" wide joints. For thin brick systems: approximately 30-45 ft.²/50 lb. bag for 1/2" x 2 1/4" x 8" thin brick with 3/8" wide joints.

Packaging: 50 lb. bags.

DUROCK Exterior Basecoat

Material: Ready-to-mix portland cement mortar containing dry latex polymers, gray.

Approximate Coverage: 80-90 ft.² for 1/8" thick basecoat.

Packaging: 50 lb. bags.

DUROCK Exterior Finish

Material: Ready-mixed acrylic coating, fine or coarse finish.

Approximate Coverage: For fine float, 150-175 ft.²/pail; for coarse float, 100-125 ft.²/pail. Coverage varies with finish and texture. Minimum coating thickness 1/16", maximum 3/16".

Colors: 33 standard colors; custom colors available on request.

Packaging: 67.5 lb. net weight pails.

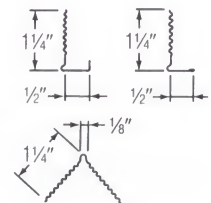
DUROCK Zinc Trim and Bead

Provide superior edge protection and corner reinforcement for DUROCK Cement Board System.

DUROCK J-Trim—8' length, 50 pcs. per carton.

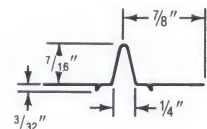
DUROCK L-Trim—8' length, 50 pcs. per carton.

DUROCK Corner Bead—8' length, 60 pcs. per carton.



DUROCK Control Joint

Made of roll-formed zinc to resist corrosion. Plastic tape protects 1/4" wide, 7/16" deep opening and is removed after application of finish. Supplied in 8' length, 25 pcs. per carton.



DUROCK Exterior Cement Board Design Properties for 1/2" Thickness

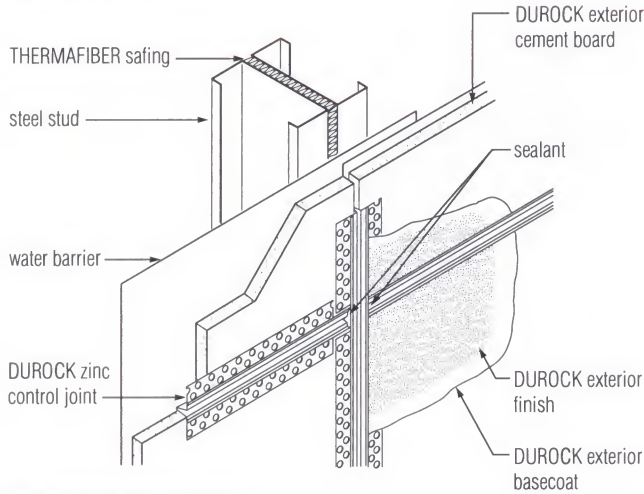
Property	ASTM test ref.	Exterior Value	RB Value
Flexural Strength - psi	C947-81	1000	750
Uniform load—psf (16" o.c. stud spacing)	—	40 max.	30 max.
Water Absorption - % by wt. 24 hrs	C473-84	10	10
Nail Pull Resistance - lb., 0.4" head diameter (wet or dry)	C473-84	125	125
Weight - psf	C473-84	3	3
Freeze/Thaw Resistance - Procedure A number of cycles with no deterioration	C666-84	100	100
Surface Burning Characteristics—flame/smoke	E84-84	5/0	5/0
Min. Bending Radius*—ft.	—	8	8

*Requires special framing. Specifications and details available on request.

Thermal Properties

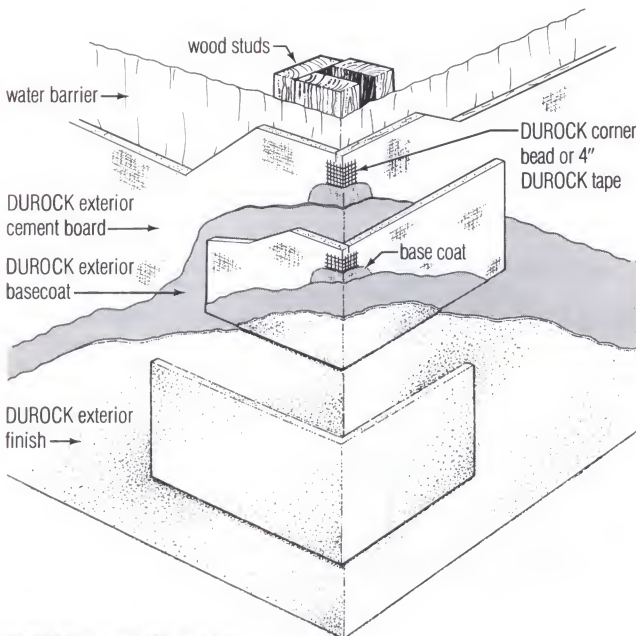
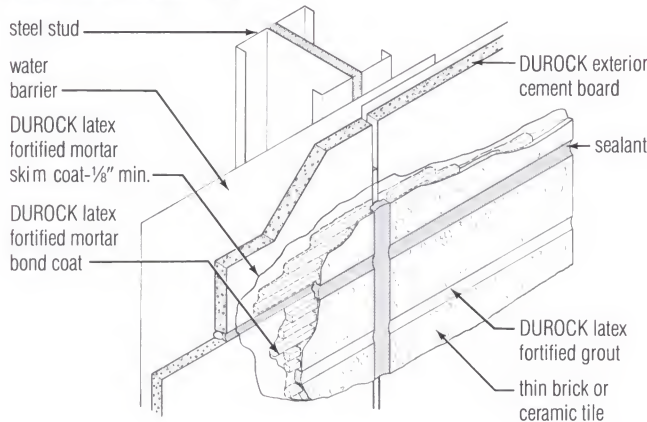
Thickness (in)	Product	"R"
3	THERMAFIBER SAFB	11.1
3 1/2	THERMAFIBER FS-15	13.0
1/2	SHEETROCK brand Gypsum Panels	0.45
5/8	SHEETROCK brand Gypsum Panels	0.56
1/2	DUROCK Exterior Cement Board	0.26
1	DUROCK Insulation Board	3.8

DUROCK exterior finish

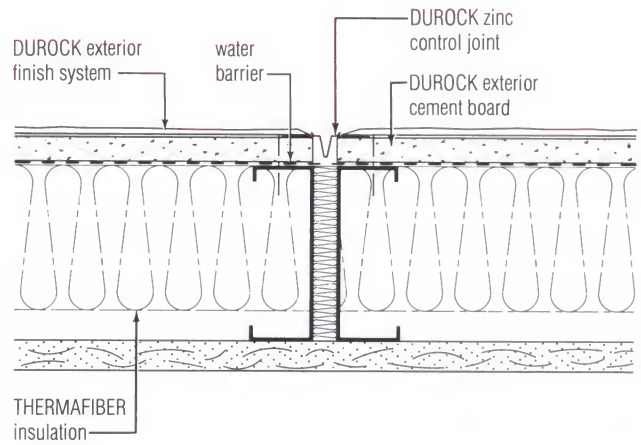


Control joint intersections

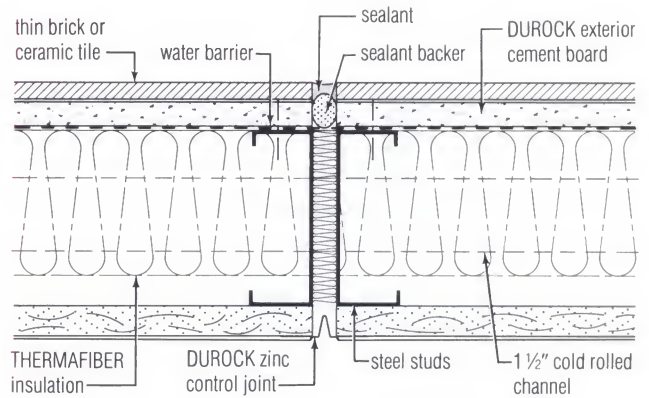
Thin Brick or Ceramic Tile



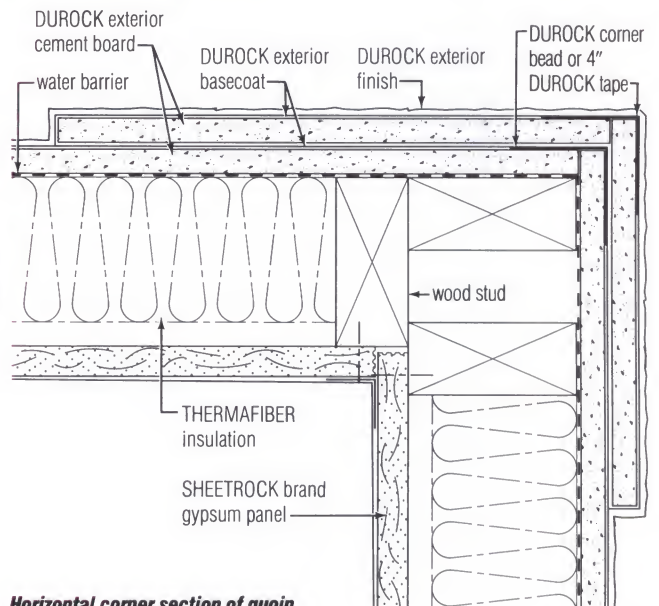
DUROCK corner with quoins



Vertical surface control joint

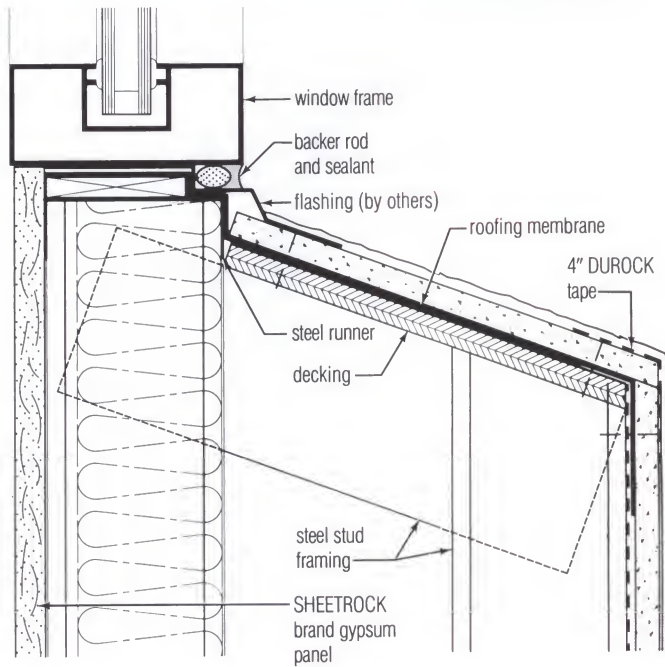
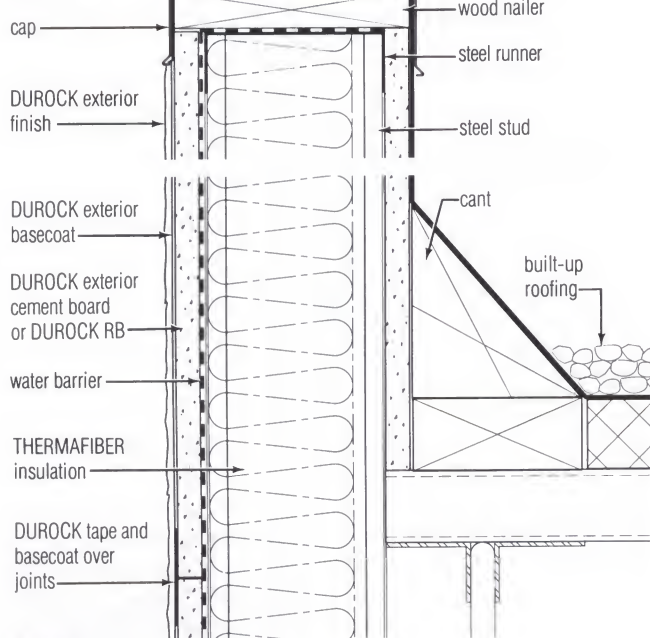


Vertical building control joints

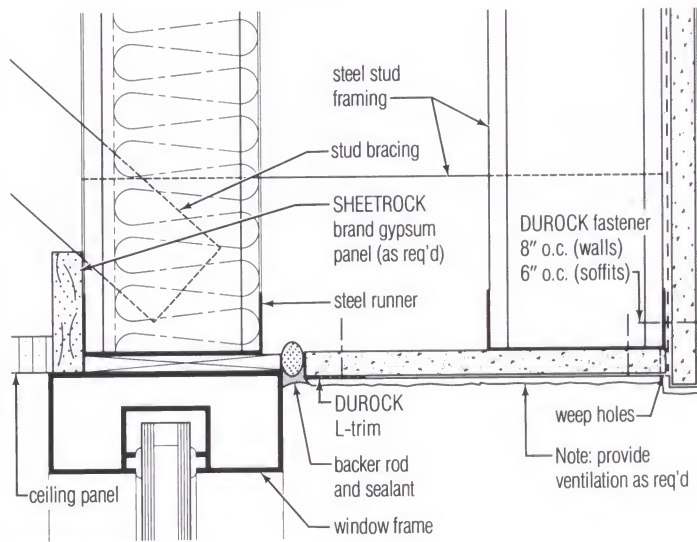
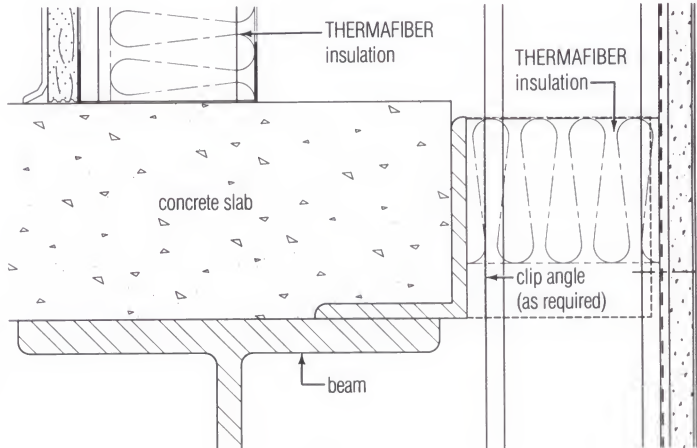
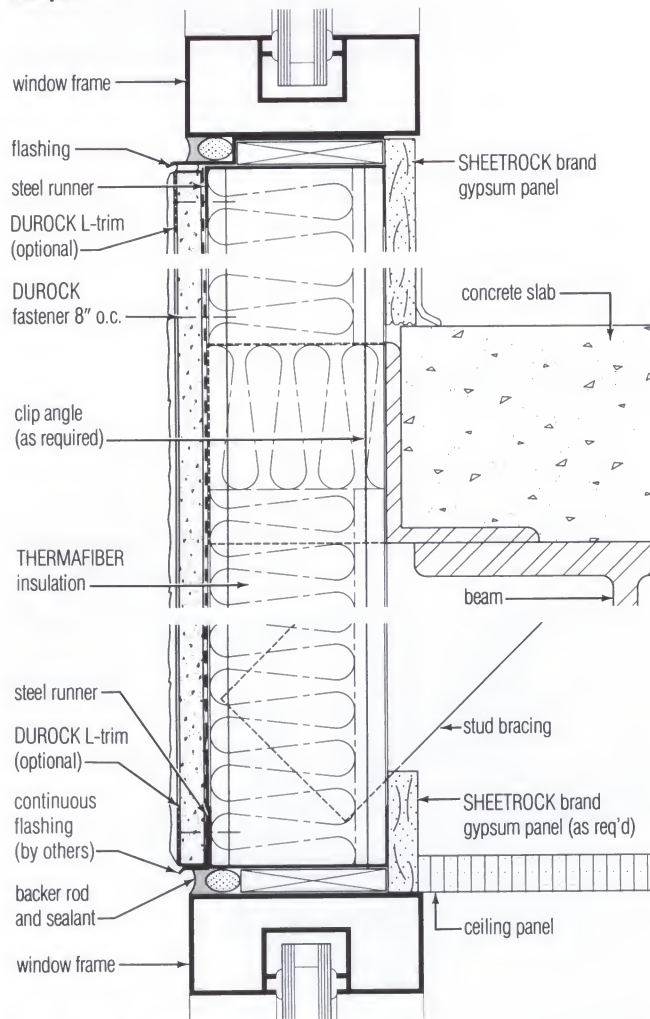


Horizontal corner section of quoin

scale: 3" = 1'-0"



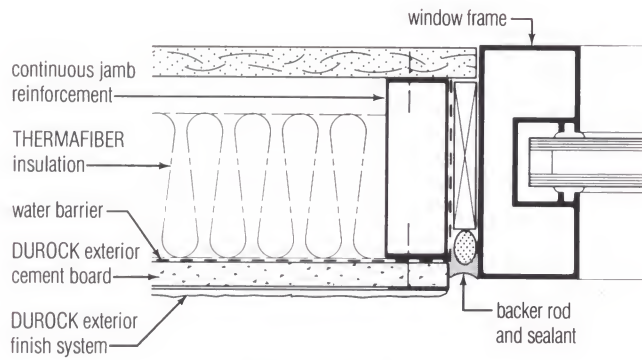
Parapet



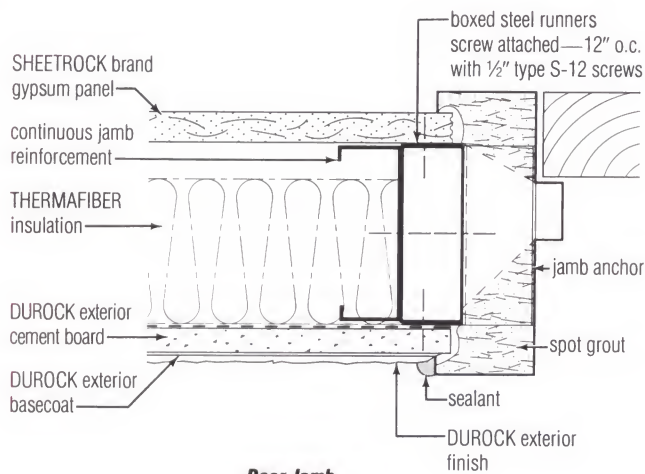
Stud bypass-Intermediate floor

Spandrel wall

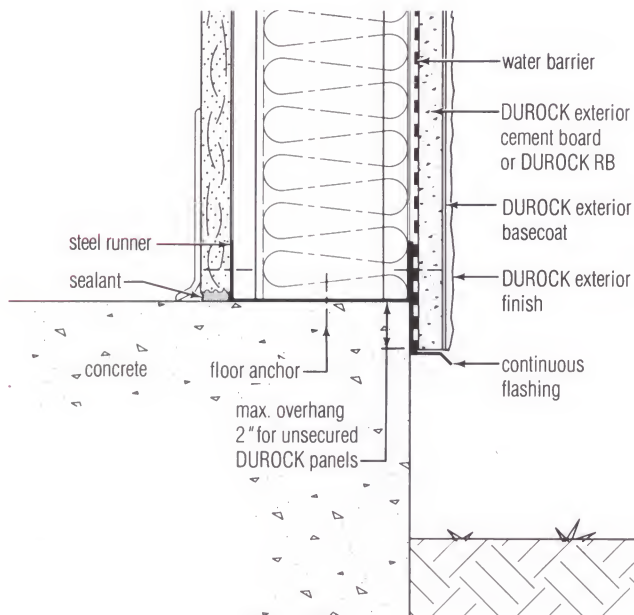
scale: 3" = 1'-0"



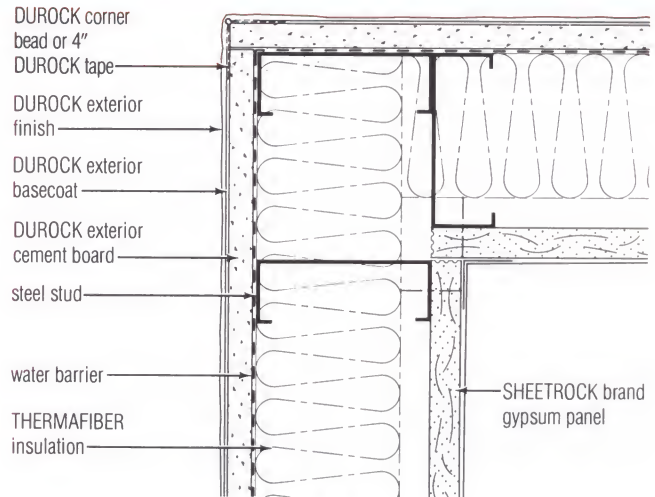
Window jamb



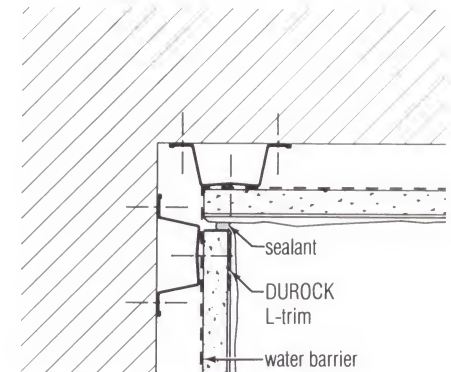
Door Jamb
50 to 200-lb.
(Head similar)



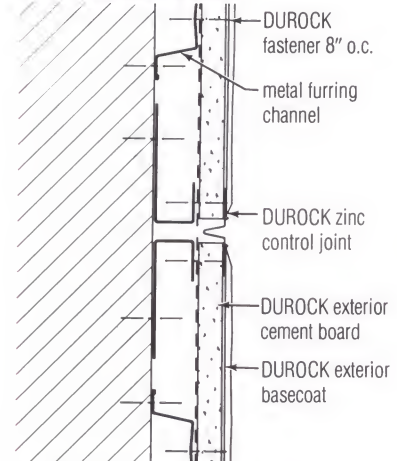
Foundation



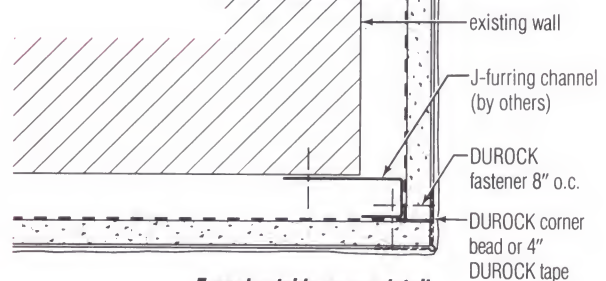
Corner



Furred inside corner detail

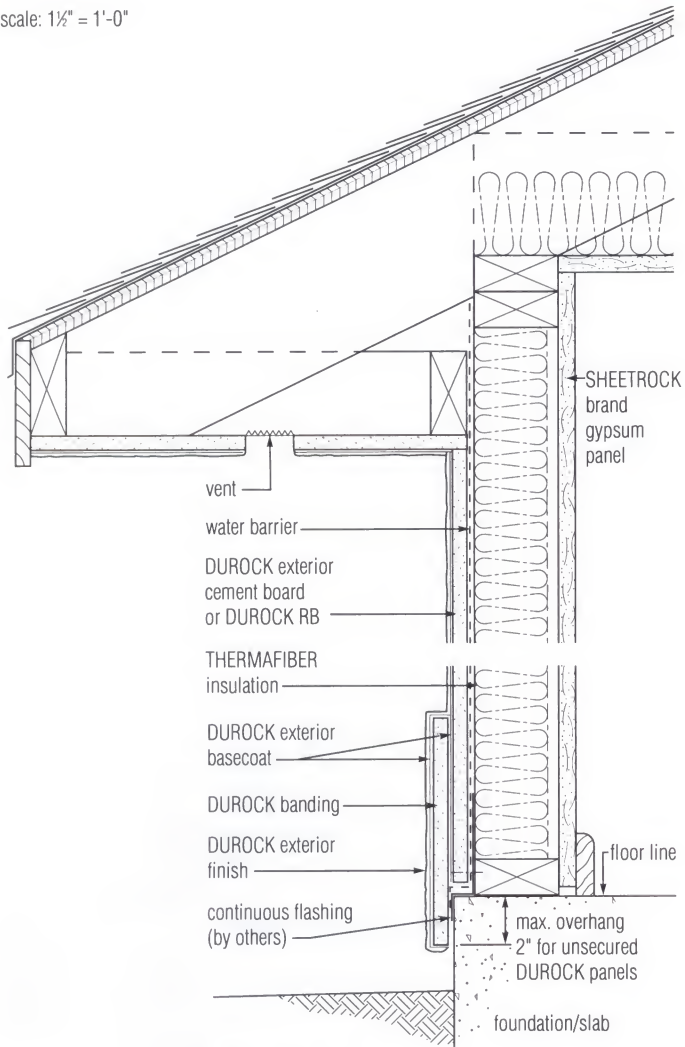


Furred control joint detail

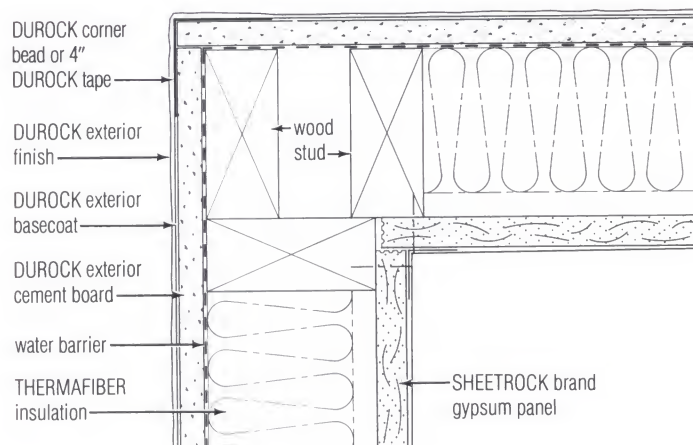


Furred outside corner detail

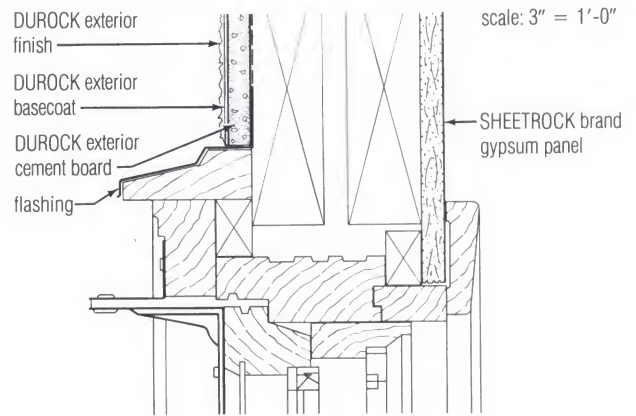
scale: 1½" = 1'-0"



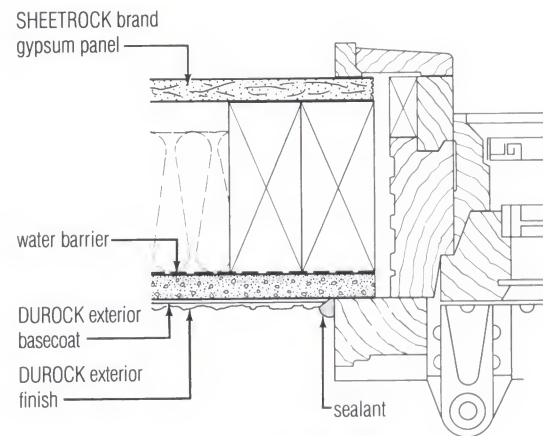
Foundation/soffit detail



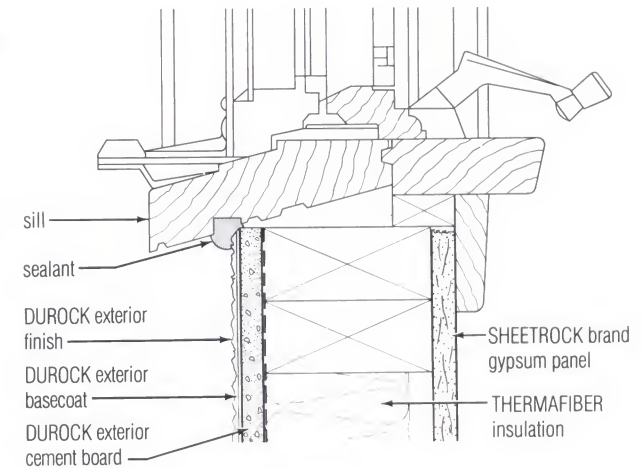
Corner



window head
(door similar)

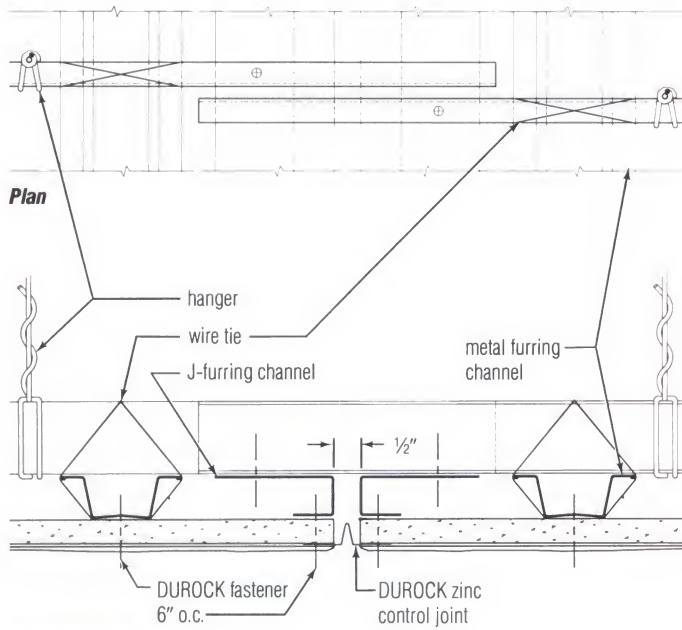


window jamb
(door similar)

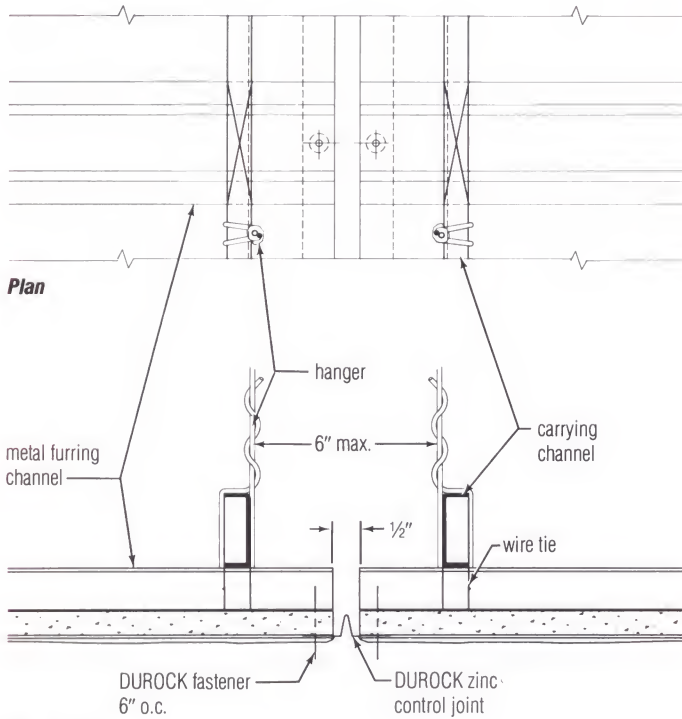
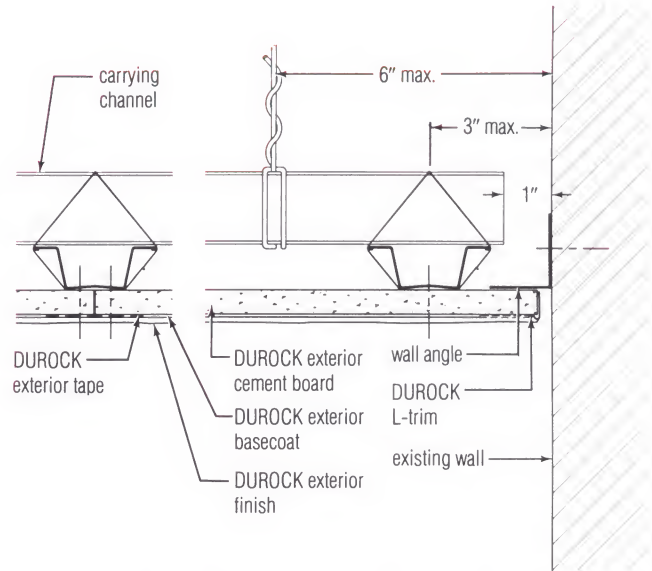


window sill
(door similar)

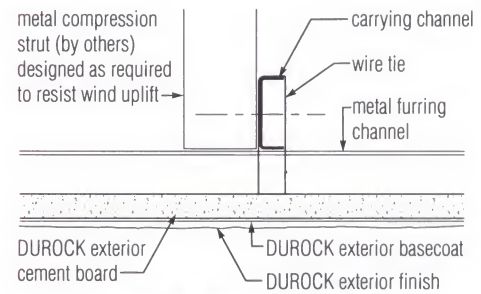
scale: 3" = 1'-0"



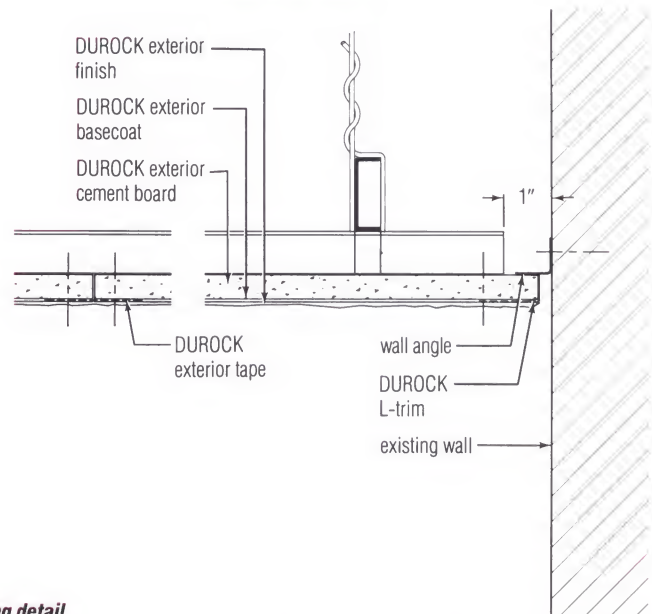
North/South Section



East/West Section



Exterior suspended ceiling
wind uplift detail



Suspended ceiling detail

1 System Performance—These specifications are for load-bearing and non-load bearing exterior systems with securely attached interior and exterior facings. The systems covered herein have been tested and evaluated for use as described. For other system applications, consult with your local representative.

All details, specifications, and data contained in this literature are intended as a general guide for using DUROCK Exterior Cement Board Systems. These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

Information in this publication should be used only for DUROCK Exterior Cement Board Systems, as physical properties of competitive products may vary. United States Gypsum Company assumes no liability for failure resulting from the use of alternative materials or improper application or installation of DUROCK Exterior Cement Board Systems as specified herein.

United States Gypsum Company will provide building officials and design professionals, upon written request, with test certification for published fire and structural data covering systems constructed with Company products and assembled to meet performance requirements of established test procedures specified by various agencies.

2 Fasteners—Specify 1¼", or 1½" DUROCK Steel Screws for 14 to 20-ga. framing. Corrosion-resistant DUROCK Screws must be used for screw-attaching all cement board and may be used for other exterior system accessories. Specify 1¼" or 1½" DUROCK Wood Screws or 1½" 11-ga. hot-dipped galvanized roofing nails with nominal ⅝" diameter head for attaching cement board to wood studs; 2¼" DUROCK Wood Screws for attaching cement board over approved ½" rigid foam insulation, plywood, or gypsum panels to wood studs. When installing trim accessories use DUROCK Screws, hot-dipped galvanized roofing nails or staples (stainless steel or monel) with ¼" to ⅜" long legs and ½" crown.

3 Window and Door Openings—All window and door openings must be properly flashed and caulked. Grout exterior steel door frames with portland cement mortar.

4 Shadowing and Spotting—When the outside temperature differs considerably from the building's interior temperature, airborne dirt can accumulate on the colder regions of walls causing "shadowing" or "spotting," particularly over fasteners and framing. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, provide a thermal separation between the interior and exterior faces.

5 Expansion and Contraction—Exterior wall surfaces should be isolated with surface control joints (sometimes referred to by the industry as expansion joints) or other means where: (a) a wall abuts a structural element or dissimilar wall or ceiling; (b) construction changes within the plane of the wall.

Location of building control joints must be detailed by the architect. Surface control joint spacing for the DUROCK Exterior Finish System is 20' in either direction; for tile and thin brick finishes, max. spacing is 16' in either direction. Steel framing at building control joints that extend through the wall (with top and bottom runner tracks broken) should have 1½" cold-rolled channel alignment stabilizers spaced a maximum of 5'0" o.c. vertically. Channels should be placed through holes in the stud

web of the first two adjacent studs on both sides of the joint and securely attached to the first adjacent stud on either side of the joint.

Cement board should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations. Do not apply tile or finishes over caulked or sealed expansion joints.

6 Air and Water Infiltration—Flashing and sealants as shown in the details must be provided to resist air and water infiltration. DUROCK Cement Board is not a water barrier. A water barrier must be installed over the studs with a 2" overlap or stapled to the back of the DUROCK Exterior Cement Board before it is applied. DUROCK Exterior Cement board must be clean and dry before application of exterior finishes. Also, for ceramic tile and thin brick, a ⅝" min. thick leveling/skim coat of DUROCK Latex Fortified Mortar must be applied to the exterior surface of the DUROCK Exterior Cement Board and allowed to set 24 hours. Accessories for exterior finishes should be made of zinc alloy.

7 Swimming Pool Enclosures—In areas of high moisture and chlorine content, adequate consideration should be given for metal hangers and framing members to assure protection against deterioration and for ventilation of excess moisture.

8 Soffits and Ceilings—DUROCK Exterior Cement Board Systems finished with ceramic tile, thin brick and DUROCK Exterior Finish may be used on properly vented soffits and ceilings with DUROCK Screws spaced 6" o.c. max. A qualified structural engineer should evaluate design including uplift bracing.

9 Leaching and Efflorescence—Latex leaching and efflorescence are natural phenomena which occur with the use of latex modified mortars and grouts through no fault in the products. To help protect against their occurrence, follow current industry guidelines and recommendations.

10 Vapor Retarders—Humidity and temperature conditions may require a vapor retarder. Its location should be determined by a qualified engineer to prevent moisture condensation within the wall.

11 Note—United States Gypsum Company reserves the right to make improvements in, or change materials and/or configurations of any products in this catalog, without prior notice and without obligation to incorporate the changes or improvements in items already manufactured.

12 Technical Assistance and Consultation are readily available from experienced technical representatives. For technical assistance on DUROCK Exterior Cement Board Systems and preparing project specifications, contact United States Gypsum Company technical services: Glendale, CA (818) 956-1882; Atlanta, GA (404) 393-0770; Chicago, IL (312) 606-5788; Tarrytown, NY (914) 332-8000.

13 Additional Information—See product folders in this series: *Gypsum Panels & Accessories* folder SA-927 for information on system components; *DUROCK Interior Cement Board Systems* folder SA-932 for interior ceramic tile base specifications; *Plaster Products, Accessories and Systems* folder SA-920 for plaster system components; *THERMAFIBER Life-Safety Fire Containment Systems* folder SA-707 for data on insulation and mineral fireproofing; *Drywall/Steel Framed Systems* folder SA-923 for load-bearing and non-load bearing steel framing systems.

Part 1: General

1.1 Scope—Specify to meet requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

Finishes, leveling/skim coats and basecoats shall not be applied to exterior cement board that is wet, frozen or contains frost. After application, and for at least 24 hours, finishes, leveling/skim coats and basecoats shall be effectively protected from rain and moisture.

In cold weather and during finish applications, DUROCK Exterior Board, skim or basecoat, mortar, finish material and air temperature must be at least 45° F and must remain at this temperature or higher for at least 24 hours after application. Hot and dry weather may affect working time of leveling/skim or basecoat and finish materials. Under rapid drying conditions, dampening of board, leveling/skim or basecoat surface may be required to improve workability.

1.5 Framing

Steel or wood framing to receive DUROCK Exterior Cement Board shall be structurally sound, free from bow, and in general compliance with local building code requirements. Damaged and bowed framing shall be replaced before installation of panels.

Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection for tile and thin brick finishes, L/240 for DUROCK Exterior Finish and EIFS. Steel framing must be 20-ga. or heavier with a G60 hot dipped galvanized coating.

Part 2: Products

2.1 Materials supplied by United States Gypsum Company.

A Cement Board—DUROCK Exterior Cement Board, ½" x 48" x 8'. DUROCK RB, ½" x 32" x 8'. Custom lengths and thicknesses available (see page 8).

B Fasteners—DUROCK Steel Screws, 1¼" or 1½" for 14 to 20-ga. steel framing; DUROCK Wood Screws, 1¼", 1½" or 2¼", Wafer Head, for wood framing.

C Joint/Corner Reinforcement—4" wide, DUROCK Exterior Tape.

D Leveling/Skim and Bond Coats—Meeting ANSI A118.4: DUROCK Latex Fortified Mortar for ceramic tile and thin-brick.

E Grout—Meeting ANSI A118.6: DUROCK Latex Fortified Grout for ceramic tile and thin-brick. Custom colors available.

F Basecoat for DUROCK Exterior Finish System—DUROCK Exterior Basecoat, gray, ready-to-mix portland cement mortar containing dry latex polymers.

G Finish Coat for DUROCK Exterior Finish System—DUROCK Exterior Finish, ready-mixed acrylic coating, available in 33 standard colors, (fine or coarse).

H DUROCK EIFS—DUROCK Reinforcing Mesh and DUROCK Insulation Board (specify from DUROCK Exterior Insulation and Finish System Folder CB-269.)

I Interior Surfaces—

- 1 Gypsum Panels—(specify from *Gypsum Panels and Accessories* folder SA-927.)
- 2 Veneer Plaster—(specify from *Plaster Products, Accessories and Systems* folder SA-920.)
- 3 Ceramic Tile—(specify from *DUROCK Interior Cement Board Systems* folder SA-932.)

J Insulation—THERMAFIBER Mineral Fiber Insulation (specify from *THERMAFIBER Life Safety Fire Containment Systems* folder SA-707).

K Control Joint—DUROCK Control Joint.

L Metal Trim—DUROCK ½" J-Trim and DUROCK ½" L-Trim.

M Corner Reinforcement—DUROCK Corner Bead.

N Caulking—SHEETROCK Acoustical Sealant for interior applications.

2.2 Materials by Other Suppliers

A Epoxy matrix and stone aggregate (contact epoxy matrix supplier for suitability and application).

B Thin-brick (contact supplier for suitability).

C Exterior grade ceramic tile (contact supplier for suitability).

D Membrane—No. 15 asphalt felt or Grade D, 60 minute building paper or equivalent water and air infiltration barrier.

E Sheathing Substrates—Max. ½" thick extruded polystyrene or polyisocyanurate rigid foam insulation, exterior grade gypsum sheathing or exterior grade plywood.

F Staples—½" crown, ¼" to ⅜" leg, galvanized, monel or stainless, for attaching membrane and trim accessories.

G Nails—1½" long min., 11-ga., hot-dipped galvanized roofing nails with nominal ⅝" diameter head (obtain locally) for wood framing.

H Sealant—manufacturer's approved for exterior applications.

I Flashing—corrosion-resistant flashing.

Part 3: Execution

3.1 Framing Erection

Space wood and steel framing a maximum of 16" o.c. Adequate diagonal bracing meeting design requirements must be installed flush with the framing members prior to application of DUROCK Board. The studs of freestanding furred walls must be secured to exterior wall with wall furring brackets or laterally braced with horizontal studs or runners spaced 4' o.c. max.

3.2 Membrane—Water Barrier

A For steel framing, secure membrane with tape or adhesive and immediately apply DUROCK RB/Exterior Cement Board, or staple membrane to back of DUROCK RB/Exterior Cement Board with ½" crown, ¼" to ⅜" leg staples. Extend membrane 2" to 3" beyond board edges and lap membrane at joints in shingle-like manner to prevent water penetration into stud cavity.

B For wood framing, plywood or gypsum sheathing, staple membrane and immediately apply DUROCK Panels.

3.3 DUROCK RB/Exterior Cement Board Application

A Apply DUROCK RB/Exterior Cement Board with rough side toward exterior and with ends and edges over supports. Fit ends and edges closely, but not forced together. For DUROCK RB/Exterior Cement Board with staple-attached membrane, apply in a shingle-like manner beginning at bottom of wall. Stagger end joints in successive courses.

B Fasten DUROCK RB/Exterior Cement Board to framing with specified fasteners. Drive fasteners in field of DUROCK RB/Exterior Cement Board first, working towards ends and edges. Hold DUROCK RB/Exterior Cement Board in firm contact with framing while driving fasteners. Space fasteners max. 8" o.c. for walls, 6" o.c. for ceilings, with perimeter fasteners at least ⅜" and less than ⅝" from ends and edges. Drive nails and screws so bottom of heads are flush with surface of DUROCK Panels, to provide firm panel contact with framing. Do not overdrive fasteners.

C Installation Practices—DUROCK RB/Exterior Cement Board should be cut to size utilizing a knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device. Worker should wear NIOSH-approved dust mask.

3.4 Joint Reinforcement

For tile and thin brick finishes, prefill joints with DUROCK Latex Fortified Mortar. Embed DUROCK Exterior Tape centered over all joints and corners but not overlapped. For DUROCK Exterior Finish System, prefill joints with DUROCK Exterior Basecoat and then immediately embed 4" tape and level the joints. As an alternative, apply DUROCK Exterior Tape over joint and then apply DUROCK Latex Fortified Mortar or DUROCK Exterior Basecoat, forcing it through tape to completely fill and level joints. This may require several passes. For exposed aggregate finishes, apply DUROCK Exterior Tape and immediately apply the required thickness of coating over entire surface and embed stone aggregate.

3.5 Trim Accessories

When specified, DUROCK trim accessories are applied using DUROCK Screws, hot-dipped galvanized roofing nails, monel or stainless staples. Space staples 6" to 9" o.c. in each flange.

For DUROCK Exterior Finish System, treat trim accessories with basecoat and level with adjacent board areas. Fill all voids and depressions with basecoat and feather mortar edges. The treated joints and trim areas must be allowed to cure for a minimum of 4 hours before application of basecoat.

3.6 Exterior Finish—

3.6.1 DUROCK Exterior Finish System—

- A Basecoat**—Apply a $\frac{1}{8}$ " minimum thick, uniform layer of DUROCK Exterior Basecoat over the entire surface after joints and trim have cured a minimum of 4 hours. Apply material by tightly scratching in an initial coat, then doubling up to the $\frac{1}{8}$ " thickness. Do not add sand or other additives. Do not apply material greater than $\frac{1}{8}$ " thick in a single application. Leave surface smooth and flat. Under rapid drying conditions, dampen surface as necessary to improve workability. Allow basecoat to cure 24 hours before application of DUROCK Exterior Finish Coat.
- B Finish Coat**—Trowel-apply DUROCK Exterior Finish in a $\frac{1}{8}$ " minimum thick, uniform layer over all base-coated surfaces. Do not add sand or other additives to create heavier textures (material is not designed for texture heavier than $\frac{1}{8}$ "). If necessary, adjust consistency and working properties by adding up to 8 oz. clean water per 67.5 lb. pail of finish material. Add the same amount of water to all subsequent pails to ensure color uniformity. Mix well for uniform consistency. Texture as required, using plastic or wood floats.

- C Spray Application**—For information on spray application of basecoat and finish, contact your technical representative.

3.6.2 Thin Brick and Ceramic Tile Systems—Apply a $\frac{1}{8}$ " min. thick leveling/skim coat of DUROCK Latex Fortified Mortar over DUROCK Board surfaces. Apply leveling/skim coat uniformly over entire surface. Leave surface smooth and flat. Allow to set 24 hours before application of bond coat for setting tile and thin brick.

Ceramic tile and thin brick on walls may not exceed $\frac{3}{4}$ " thickness, 18"x18" size, and 10 psf. Install (thin brick) (ceramic tile) in accordance with ANSI 108.5 specifications and manufacturer's directions. Using the notched trowel required for the thickness of thin brick or tile being installed, apply DUROCK Latex Fortified Mortar to obtain uniform setting bed. Back-butter the (thin brick) (ceramic tile) for 100% mortar contact. Install units by firmly pressing them into freshly applied mortar. Use a sliding and twisting motion to embed units and obtain a 100% mortar contact. Beat-in ceramic tile in accordance with accepted practice. Apply DUROCK Latex Fortified Grout after mortar has set firmly for 24 hours. Mix and apply grout according to directions on package. Force maximum amount of grout into joints. Tool and compress grout into joints to provide neat and uniform appearance. Clean

grout from finished surfaces and cure installation as required by ANSI A108.10 Specification.

3.6.3 Epoxy Matrix System—DUROCK Exterior Cement Board is a suitable substrate for many epoxy matrix stone aggregate products. Contact epoxy matrix suppliers regarding suitability of their products for this use. Mix and apply epoxy and stone aggregate material directly to the taped DUROCK Exterior Cement Board surface according to manufacturer's directions.

3.6.4 Layered Details

To create bands, quoins, dentils and other layered details, cut DUROCK Exterior Cement Board to specified size and shape. Laminate to basecoated DUROCK Exterior Cement Board following same application procedure as with ceramic tile.

3.7 DUROCK Exterior Finish Applied to Concrete or Masonry

Prior to application of basecoat, new poured-in-place concrete construction should be allowed to cure for 28 days and all structural cracks and large surface voids must be filled and leveled. For new construction, the joints between the concrete masonry units should be struck flush. For existing construction the joints must be pre-filled with DUROCK Exterior Basecoat. For poured-in-place concrete, any ridges caused by form separation shall be leveled. Small surface voids (i.e., cracks, spalled areas) must be pre-filled with DUROCK Exterior Basecoat and allowed to cure for 24 hrs. prior to the actual basecoat application. Several coats may be required. Allow basecoat to cure a minimum of 4 hours between each coat.

Apply DUROCK Exterior Finish as stated in 3.6.1 above.

3.8 Wall Furring Applications

Contact your local U. S. Gypsum Company representative for specifications and details on Z-furring and DWC-furring systems.

3.9 DUROCK Exterior Insulation and Finish System

Refer to CB-269 DUROCK Exterior Insulation and Finish System for construction details and architectural specifications.

Disclaimer

United States Gypsum Company does not recommend or approve any exterior wall assemblies other than those specifically set forth in its current printed literature and shall have no liability for any difficulties or failure resulting from the use or installation of products contrary to United States Gypsum Company recommendations or specifications, including the use of its products along with those of other manufacturers or use in unapproved systems.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered. The DUROCK Exterior Cement Board Systems are backed by a comprehensive 10-year limited warranty. Please contact United States Gypsum Company for complete details.

Trademarks—The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, DUROCK, SHEETROCK, IMPERIAL, FIRECODE.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Patents: DUROCK Cement Board is covered by the following patents: 4,916,004; 4,450,022; 4,488,909; and 4,504,335.

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SA-707

THERMAFIBER[®] Life-Safety Fire Containment Systems



TABLE OF CONTENTS

THERMAFIBER Life-Safety Insulations

Superior
Fire Containment Products

3

Superior Fire Containment
Performance

4

Fire/Smoke-Stop System

5

Curtain Wall Insulation

8

Safing Insulation

12

Kitchen Duct Fireproofing

12

Structural Fireproofing

13

THERMAFIBER Thermal and Sound Control Insulations

Sound Attenuation Fire
Blankets

14

Commercial Blankets—
FS-15, FS-25

16

Product Data and Insulating Values

Sizes and
Shipping Points

16

Physical Properties

17

Thermal Conductivity

17

Surface Burning Characteristics

17

Specification Compliance

18

Good Design Practices

18

Architectural Specifications

19



On the cover:
777 S. Figueroa Tower
Los Angeles, California
Architect:
Cesar Pelli & Associates
Associate Architect:
Langdon Wilson Architecture Planning

Above:
1999 Avenue of the Stars
Century City, California
Architect:
Johnson Fain & Pereira Associates

The superior fire protection of THERMAFIBER insulation comes from its composition of mineral fibers with an ability to resist temperatures over 2,000°F (1,100°C). By contrast, glass fiber insulations begin to disintegrate at about 1,050°F (565°C).

THERMAFIBER insulations are rated "noncombustible" as defined by NFPA Standard 220. With foil facing and SMOKE SEAL compound, THERMAFIBER insulations also impede the passage of smoke.

THERMAFIBER insulations contain no asbestos. They are moisture-resistant, noncorrosive, nondeteriorating, mildew-proof and vermin-proof. If exposed to damp conditions, THERMAFIBER insulations adsorb less than one percent moisture.

The exceptional durability of THERMAFIBER insulations provides long-term retention of insulating values. Clean, positive mechanical attachment of dry units offers installation convenience and economy in any weather and at any temperature.

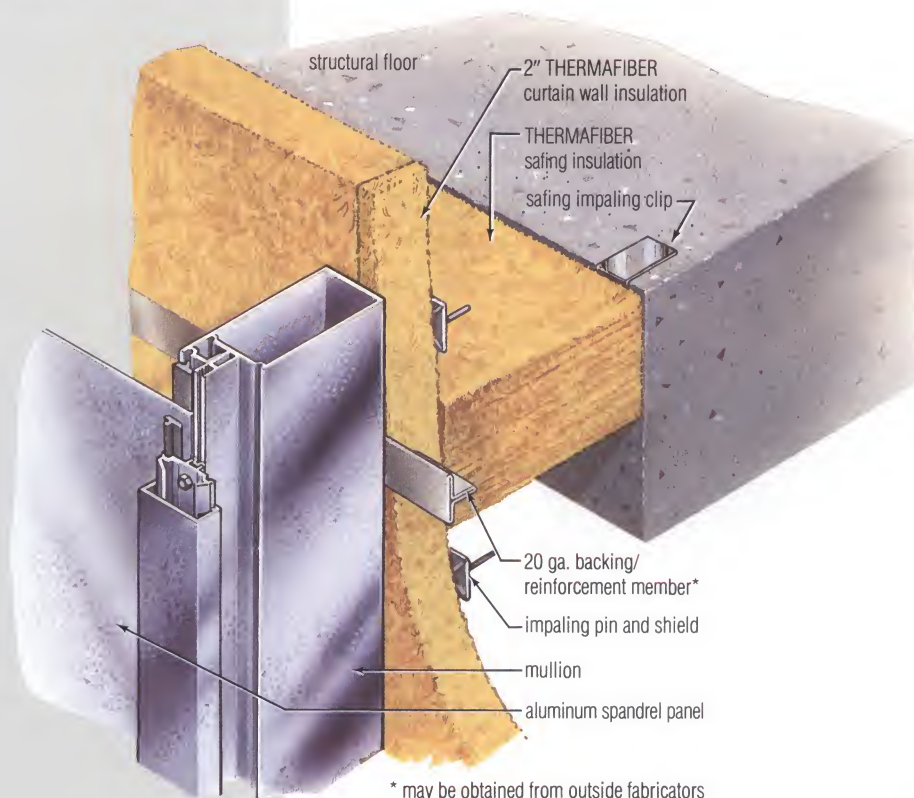
SMOKE SEAL compound, a fire-resistant sealant, is used in conjunction with curtain wall and/or safing insulations to make the THERMAFIBER Fire/Smoke-Stop System the most comprehensive, yet economical, system available for controlling both fire and smoke. It is conveniently applied with standard caulking guns or trowel applied from bulk pails.

Adequate protection against the spread of fire at the curtain wall requires that both curtain wall and safing insulations provide maximum protection in containing fire. The use of glass fiber insulation alone or in combination with THERMAFIBER insulation simply cannot provide the same level of protection as a total THERMAFIBER system.

THERMAFIBER curtain wall insulations protect spandrel panels and restrict the spread of fire to floors above. THERMAFIBER safing insulations fill the opening between the slab perimeter and the curtain wall insulation to inhibit the spread of fire through this opening.

Life-safety goals can only be reached by using high-melt-point products for both curtain wall insulation and safing. High-melt-point products include mineral fiber THERMAFIBER safing insulation and curtain wall insulation but do not include glass fiber insulations. Use of low-melt-point curtain wall insulation in conjunction with safing may result in failure of the life-safety system.

THERMAFIBER Life-Safety System Detail Used on Outdoor Fire Test
(See Page 4)



* may be obtained from outside fabricators

Performance Tested A full-scale fire test was conducted to compare the effectiveness of THERMAFIBER curtain wall insulation vs. glass fiber curtain wall insulation. The side-by-side test was conducted in a two-story, outdoor testing facility at the USG Corporation Research Center at Libertyville, Illinois.

The structure was divided vertically to form two separate units. Each was faced with identical curtain walls comprised of aluminum spandrel panels and vision glass mounted to aluminum mullion framing. Only the insulation was different. Wood cribs with 7.5 lbs. of Class A combustibles for each sq. ft. of floor area were used to fuel the test. A synopsis of the test is shown below.

Close-up inspection of the curtain wall assemblies following the test indicated that when the first spandrel panel on the glass fiber unit failed, the glass fiber insulation had already disintegrated, and the wall had been breached at the floor/wall intersection and along the vertical joints of the glass fiber curtain wall insulation. (See photo, bottom left.) As a result of the disintegration of the glass fiber insulation, the safing detail was also compromised. This created openings between the structural floor and the curtain wall and provided another path for the spread of fire. No visible deteri-

oration or separation took place on the THERMAFIBER curtain wall or safing insulation on the THERMAFIBER insulation unit (see photo bottom right).

A comparison of the results showed that, on the glass fiber unit, all three aluminum spandrel panels melted while all of the spandrel panels on the THERMAFIBER insulation unit remained intact and stayed in place. On the glass fiber unit, all three of the window heads melted while none of the THERMAFIBER insulation unit window heads showed any evidence of melting. Glass fiber insulation below the second floor disintegrated and fell away while the THERMAFIBER insulation remained intact below and above the second floor level.

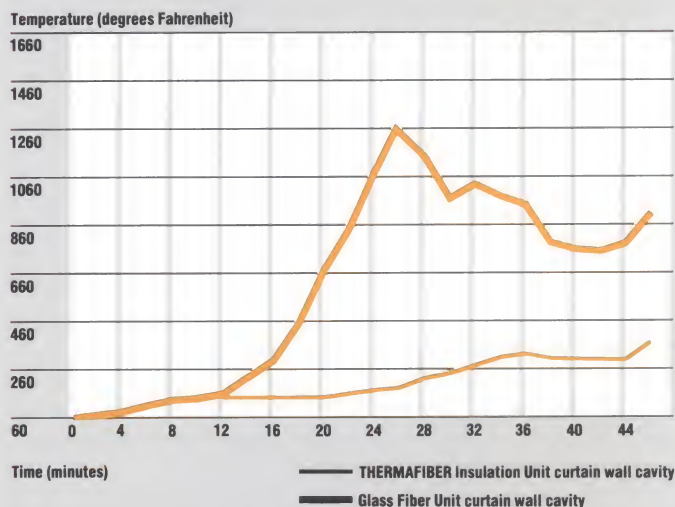
Analysis of the temperatures monitored by the thermocouples also provided an insight into the performance of the two insulation systems (see graph, opposite).

The data generated during this test demonstrated that fire containment can be achieved using THERMAFIBER curtain wall insulation for protection of spandrel panels and supporting structural members and THERMAFIBER safing insulation for perimeter fire-stopping. However, this containment cannot be realized using thermal insulations having low melt points, such as glass fiber.

8 min. 50 sec.	First lower-floor vision glass panel shatters.
14 min.	Last lower-floor vision glass panel shatters.
15 min.	Window head melts on glass fiber unit.
20 min.	Aluminum spandrel panels melt on glass fiber unit.
21 min.	Window head on glass fiber unit falls, and middle spandrel panel is dislodged.
24 min.	Middle spandrel panel on glass fiber unit falls, showing partially disintegrated insulation above second floor.
25 min. 20 sec.	Second spandrel panel on glass fiber unit is dislodged.
31 min.	Part of third spandrel panel on glass fiber unit falls away.
46 min.	Test is terminated. No visible deterioration or separation of THERMAFIBER curtain wall insulation took place.



In a comparative test, glass fiber curtain wall insulation disintegrated, dislodging spandrel panel 21 minutes into test (right). There was no visible damage to curtain wall on THERMAFIBER insulation unit (left).



Graph above shows temperatures of thermocouples placed at mid-thickness of curtain wall insulation at second floor levels of both units.



Inspection following test shows disintegration and horizontal breach of glass fiber insulation (left), while THERMAFIBER insulation shows no sign of damage (right).

Comprehensive Protection for Complete High-Rise Safety

The first priority in building safety is containment of both fire and smoke to the area of origin. For high-rise buildings, especially, this requires (1) eliminating the "flue opening" between the floor slab and spandrel panel, (2) constructing a fire containment barrier that causes the flames exiting the vision area on one floor to be diverted and cooled so that they cannot ignite combustibles on the floor above and (3) blocking smoke and flames through poke-through openings.

The USG Interiors Fire/Smoke-Stop System protects both perimeters and poke-through openings by combining THERMAFIBER safing insulation, THERMAFIBER curtain wall insulation and THERMAFIBER SMOKE SEAL compound.

How the THERMAFIBER Fire/Smoke-Stop System Works

THERMAFIBER curtain wall and safing insulations have effectively stopped fire for many years. However, experience has shown smoke to be often more life-threatening than fire.

The Fire/Smoke-Stop System for perimeter protection combines foil-faced insulation with a specially designed fire and smoke resistant sealant to form an effective barrier to the passage of smoke as well as fire.

At slab perimeters, THERMAFIBER SMOKE SEAL compound is used to seal the foil backing of THERMAFIBER safing insulation to both the foil backing of THERMAFIBER curtain wall insulation and the floor slab (see photo 1). The sealed foil completely bridges the top of the opening between the slab and the curtain wall, effectively eliminating the passage of smoke through this area. Unfaced THERMAFIBER safing insulation can also be used and topped off with a 1/2" layer of SMOKE SEAL compound.

For poke-through openings in 4 1/2" or greater thickness floor slabs, a 2 1/2" thickness of unfaced THERMAFIBER safing insulation is friction fitted into the opening around a metal penetrant and a 2" layer of THERMAFIBER SMOKE SEAL compound is applied on top with a caulking gun or trowel to seal the opening (see photos 2 and 3). Concrete block wall openings are similarly filled with safing insulation and sandwiched between equal layers of compound (minimum of 2" each side). The result is UL classified through-penetration firestop system No. 165 with a 2 or 3-hour fire rating.

For other floor penetrations and wall penetrations requiring a UL classification and meeting E814 parameters, see SA-727, USG Firestop System for Wall and Floor Penetrations. This catalog describes through-penetration USG Firestop Systems constructed of THERMAFIBER safing insulation and new FIRECODE compound.



Photo 1 THERMAFIBER Fire/Smoke-Stop System includes foil-faced curtain wall and safing insulations plus THERMAFIBER SMOKE SEAL compound to seal all joints.



Photo 2 THERMAFIBER safing provides a fire barrier at poke-through openings.



Photo 3 THERMAFIBER SMOKE SEAL compound applied to THERMAFIBER safing insulation effectively blocks particulate, smoke and air movement. System carries UL Classification 165 for through-penetration firestops, 2 hr. and 3 hr. ratings.

Through-Penetration Firestop System No. 165

Ratings: F-2 hr. and 3 hr.; T-0 hr. and ¾ hr. (see item 3 below)

1. Min. 4½" thick lightweight or normal weight concrete floor. Min. 6½" thick lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks*. See Concrete Block (CAZT) category in Fire Resistance Directory for names of manufacturers.
2. *Steel Sleeve*—Optional, Schedule 40 (or heavier) steel sleeves.
3. *Steel Pipe or Conduit*—Nom. 4" diam. (or smaller) electrical metallic tubing, nom. 6" diam. (or smaller) rigid steel conduit or nom. 6" diam. (or smaller) Schedule 10S (or heavier) steel pipe.

The T and F ratings of the system are dependent upon the diam. of the pipe or conduit and annular space between the pipe or conduit and the periphery of the opening as shown in the table below.

Max. Diam. of Steel Pipe or Conduit (in.)	Nom. Annular Space (in.)	T Rating (hr.)	F Rating (hr.)
1½	2½	¾	3
4	¾	0	3
6	¾	0	2

4. *Forming Material**—Min. 2½" thick mineral wool batts, friction fitted into the opening.
USG Interiors, Inc.—Type SAFING.
5. *Fill, Void or Cavity Material**—Min. 2" layer of fill material that is applied with a caulking gun and installed flush with the top surface.
In concrete block wall assemblies, the forming material (item 4) shall be centered in the opening depth and the fill material shall be installed symmetrically.
USG Interiors, Inc.—Type SMOKE SEAL Compound.

Through-penetration firestop system no. 165 is in accordance with UL Standard 1479 and ASTM E814. Tests have shown that the system performs under fire-fighting conditions including a 30 psi pressure hose stream. In the ratings for this system, the F rating is based on (1) preventing flame passage through the system and (2) resistance to the hose stream after fire exposure. The T rating is based on (1) resisting flame passage through the system, (2) preventing individual temperature rise on non-fire side of 325°F above ambient temperatures and (3) resisting the hose stream.

Smoke Chamber Test

Smoke inhalation causes 80% of all fire deaths, and 65% of fire deaths occur away from the fire room. These facts indicate that, while building assemblies perform sufficiently well to contain a fire to the room of origin, many are inadequate to contain smoke and fire gases.

One reason that building assemblies provide adequate fire containment performance is that this performance can be evaluated by a test procedure, ASTM E119. But there is no consensus test method to evaluate the ability of fire walls to contain smoke.

Building assemblies with through-penetrations can be evaluated by test procedure ASTM E814, which measures fire containment when utility services pass between units. However, no standard exists to measure the ability to contain smoke to the fire side of through-penetration assemblies.

In 1990, a new smoke containment test was developed at the USG Corporation Research Center at Libertyville, Illinois. This test evaluates the ability of through-penetration and curtain wall details to contain smoke to the fire side of an assembly.

A new airtight smoke containment test chamber was designed to measure the temperature, air volume and pressure subjected to the penetration details. The chamber was fabricated of stainless steel to form a double-layer open-topped box measuring 25"x25"x16" inside and 28"x28"x17½" outside. The space between the two skins was filled with high-temperature insulation. The box was fitted with thermocouples, an electric resistance heater, and piping and measuring devices for air delivery to the chamber. All openings in the shell were sealed with high-temperature sealant. A shelf angle was installed completely around the interior perimeter so that test specimens placed in the box would divide it into upper and lower chambers. Airtight performance of both chambers was tested and verified.

Three details were constructed to test the condition of a pipe passing through a concrete floor fitted with the THERMAFIBER Fire/Smoke-Stop System. Cured, sealed concrete slabs were cored with 2", 4" and 6" diameter holes. The pipe passing through the holes was surrounded by 2" THERMAFIBER safing measured from the base of the concrete slab. 2" SMOKE SEAL compound was applied over the safing and leveled to the top of the slab.

- Test Specimen 1—2" diam. hole passing 1" diam. pipe.
- Test Specimen 2—4" diam. hole passing 2" diam. pipe.
- Test Specimen 3—6" diam. hole passing 2" diam. pipe.

Two details were constructed to test the condition of a curtain wall fitted with THERMAFIBER safing sealed with SMOKE SEAL compound and located a distance from the floor edge. Two cured, sealed concrete slabs were cast, each with a 16"x6" slot. A 16" length of 1" CW 90 foil-faced THERMAFIBER curtain wall insulation was secured along the long edge of the slot.

- Test Specimen 4—Slot was filled with foil-faced THERMAFIBER safing and installed foil-face up. Interfaces between the safing and the slab and curtain wall insulation foil face were both caulked with SMOKE SEAL compound.
- Test Specimen 5—Slot was filled with unfaced THERMAFIBER safing up to the top ½". Top ½" was filled with SMOKE SEAL compound.

Result: Overpressures measured in actual fire conditions range from 10 to 40 pascals (0.0015 to 0.0058 psi) above atmospheric pressure. These overpressures would tend to drive the smoke and fire gases from the fire room to adjoining rooms. Five details were tested in which the overpressures were varied. The following table shows the volume of gas passed through these fire details per unit time at an overpressure of 40 pascals, the maximum overpressure expected in an actual fire.

THERMAFIBER safing insulation is classified as forming material for use in through-penetration firestops by Underwriters Laboratories, Inc.

UL Listed 62L3 For Forming Materials



* Bearing the UL Classification Marking

Gas Volume Rate at Maximum Fire Pressure

Test Specimen	Gas Volume Rate of Flow (Standard Cubic Feet per Minute)
<i>THERMAFIBER Fire/Smoke-Stop System</i>	
Test Specimen 1 (2" diam. hole/1" diam. pipe)	0.53
Test Specimen 2 (4" diam. hole/2" diam. pipe)	0.58
Test Specimen 3 (6" diam. hole/2" diam. pipe)	0.70
<i>Curtain Wall System</i>	
Test Specimen 4 (Foil-faced safing with SMOKE SEAL around perimeter)	0.43
Test Specimen 5 (Unfaced safing with 1/2" SMOKE SEAL topping)	0.80

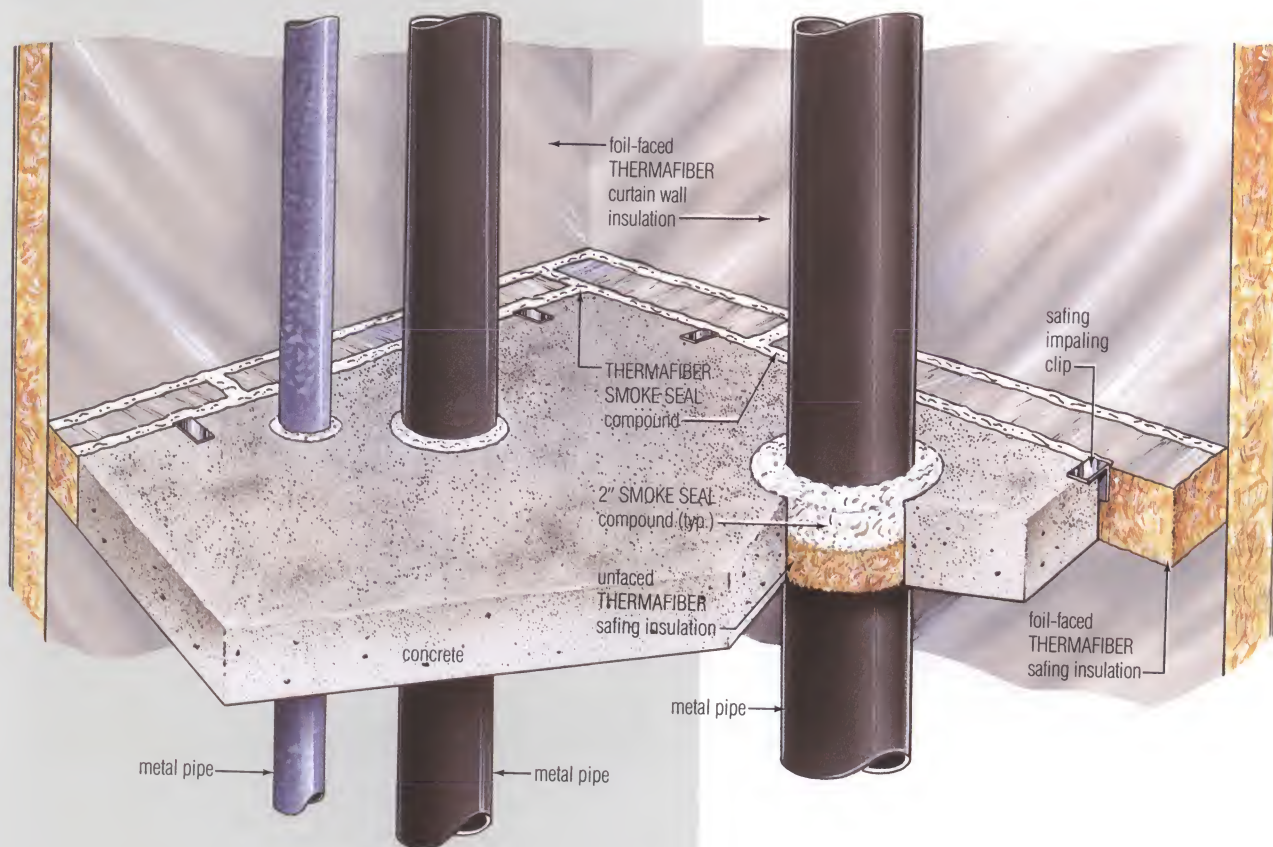


Smoke chamber test of curtain wall detail.



Smoke chamber test of THERMAFIBER Fire/Smoke-Stop System.

THERMAFIBER Fire/Smoke-Stop System for Perimeter and Poke Through Protection



United States Gypsum Company and USG Interiors, Inc. developed fire containing exterior curtain wall systems and continue to be leaders in this field. THERMAFIBER insulation, an integral component in curtain wall systems for more than 20 years, provides fire resistance, sound isolation and thermal performance.

The exterior spandrel component is usually a panel of aluminum, porcelainized steel, structural glass, concrete, marble or granite and backed with insulation for thermal control. *To ensure spandrel integrity, the insulation backing must be a positive fire-stopping material.*

Three distinct THERMAFIBER curtain wall insulation products turn spandrel panels into fire barriers. Designed for quick mechanical attachment, these noncorrosive mineral fiber insulations function equally well in exterior column covers and in window and track fillers. Blankets are available in three different densities: 4 lb./cu. ft.—CW 40; 6 lb./cu. ft.—CW 70; 8 lb./cu. ft.—CW 90.

Regular Curtain Wall Insulation



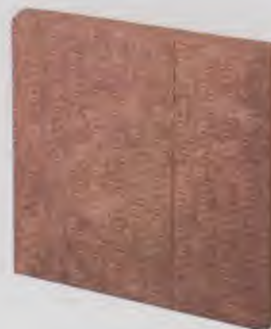
- *Regular Curtain Wall Insulation* comes as semi-rigid blankets of unfaced felt for backing spandrel panels of opaque material where no vapor retarder is needed.

FSP Curtain Wall Insulation



- *FSP Curtain Wall Insulation* is the same as regular curtain wall insulation with a tough scrim-reinforced foil facing that serves as a vapor retarder. The facing also adds durability for field installation.

Dark Curtain Wall Insulation



- *Dark Curtain Wall Insulation* is similar to regular curtain wall insulation except it has a darker color for backing dark-colored glass spandrel panels. Using dark insulation instead of light insulation improves the look of the assembly. Because the combined effects of color and shading can be unpredictable, a full-scale mock-up of the insulated spandrel is required to assure desired appearance.



Typical Fire Containment System Fire test (USG 9-29-83) of typical curtain wall spandrel detail (above) demonstrates weakness in combining glass-fiber curtain wall insulation with THERMAFIBER Safing Insulation; the glass-fiber spandrel insulation melted in 10 minutes; the glass spandrel shattered in 21 minutes, 47 seconds. THERMAFIBER Safing Insulation fell out intact.

Typical Fire Containment Designs/Tests

In February 1989, USG Interiors tested a curtain wall assembly with an unprotected granite panel to determine whether granite panels need fire protection in curtain wall assemblies. THERMAFIBER safing insulation was used to safe-off the opening between the floor slab and the granite panel. During the fire exposure, numerous cracks formed in the 3-cm (about 1-in.) thick granite panel, beginning at seven minutes into the test. The cracks went completely through the granite, demonstrating that even noncombustible materials like granite require fire protection. Previous tests have shown that THERMAFIBER curtain wall insulation provides this protection and prevents fire from penetrating the curtain wall and spreading to the floor above.

In another curtain wall test, glass spandrel panels were fire tested with glass fiber curtain wall insulation and THERMAFIBER safing insulation. Because of the glass fiber's inability to resist high temperatures, it began to melt at ten minutes and resulted in the glass spandrel panel shattering at 21 minutes, 45 seconds. The THERMAFIBER safing insulation fell out intact (see photos on page 8). This test demonstrated that, in order to be effective, curtain wall assemblies protected with THERMAFIBER safing insulation must also contain THERMAFIBER curtain wall insulation, which can provide protection at temperatures of 2,000°F.

USG Interiors, Inc. has also conducted fire tests to measure the performance of THERMAFIBER curtain wall insulation against glass fiber and polyurethane insulations for protecting aluminum spandrel panels. Fire tested at temperatures up to 2,080°F, the THERMAFIBER insulation effectively resisted the passage of flame. It kept aluminum spandrel panel temperature well below melt point until the test

was terminated more than 5 hours later. Other insulation types failed in 26 minutes or less (see table, opposite).

Curtain Wall Checklist

The following checklist contains important details that must be included in a THERMAFIBER fire containment system.

1. THERMAFIBER curtain wall insulation must be attached using mechanically secured impaling pins, screws, or other positive mechanical attachment method.
2. Curtain wall insulation must protect aluminum mullions from fire.
3. Safing insulation is compression fit (min. 1/2" wider than opening) into safe-off area (2"-8") and supported with safing "Z" clip. When safe-off area is less than 2" wide safing insulation may be friction fit and topped off with 1" layer of SMOKE SEAL compound.
4. A backing/reinforcement member is placed horizontally in back of the curtain wall insulation and is mechanically attached horizontally mullion to mullion to prevent bowing of curtain wall insulation due to pressure applied from compression fit safing insulation. Typical reinforcement members include hat channels, "L" angles and "T" angles, which may be obtained from outside fabricators.

Fire-Containment Time Comparison

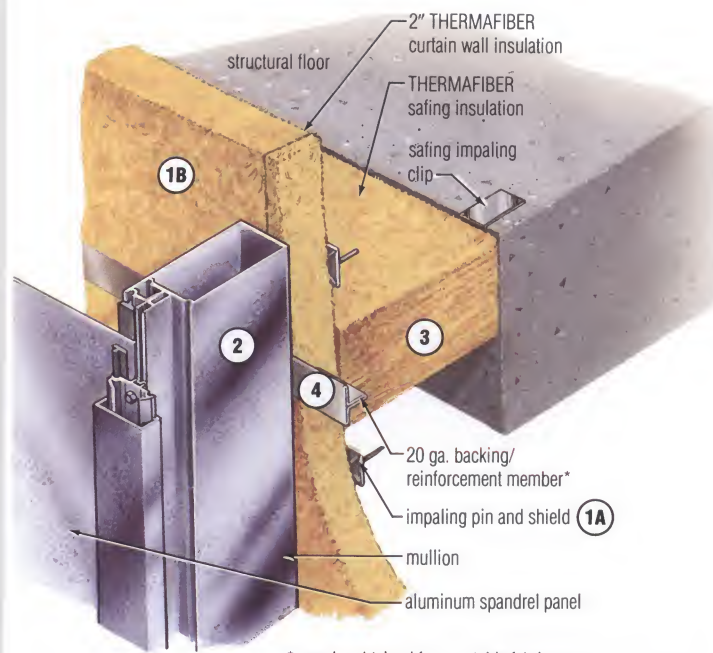
Insulation Type	ASTM E119 Test Time ⁽¹⁾
High-melt-point	
THERMAFIBER curtain wall insulation	5 hr. 5 min. ⁽²⁾
Low-melt-point	
Glass fiber (6-pcf density)	26 min. ⁽³⁾
Glass fiber (4-pcf density)	12 min. ⁽³⁾
Polyurethane (fire-resistant type)	2 min. ⁽³⁾

(1) Time duration of test to point at which panel is breached, allowing passage of flame and hot gases; test controlled in accordance with ASTM E119 time/temperature curve.

(2) Test of 1/4" thick aluminum curtain wall panel with insulation exposed to fire, witnessed by The Consulting Engineers Group Inc., Feb. 18, 1974. No melting or disintegration after 5 hr. 5 min. When temperature reached 2,080°F, the aluminum panel was still intact. However, to avoid furnace damage, the test was terminated.

(3) Test of 1/4" curtain wall panel with insulation exposed to fire, witnessed by Wiss, Janney, Elstner Associates, Inc., Oct. 16-20, 1972.

For additional information and details on fire containment tests, see Curtain Wall Insulation folder IW-682.



* may be obtained from outside fabricators

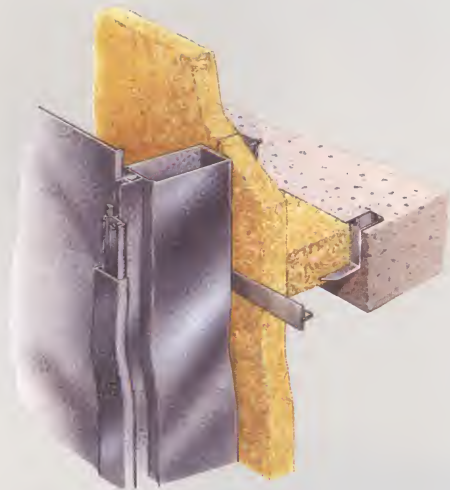
Current fire testing procedures are designed to evaluate a specific element (wall, beam or floor-ceiling). However, containing fire at an exterior wall requires fire endurance of the *entire insulating system* protecting both the spandrel and

the intersection of the floor at the spandrel. In the absence of an established fire testing procedure, USG Interiors developed a test to measure the fire containment of a complete curtain wall and safing insulation assembly.

Aluminum Curtain Wall Fire Containment

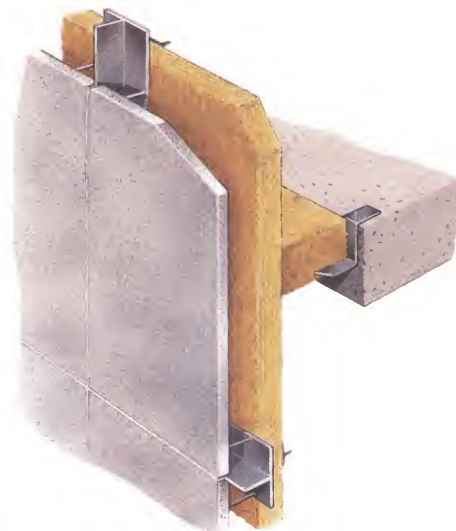
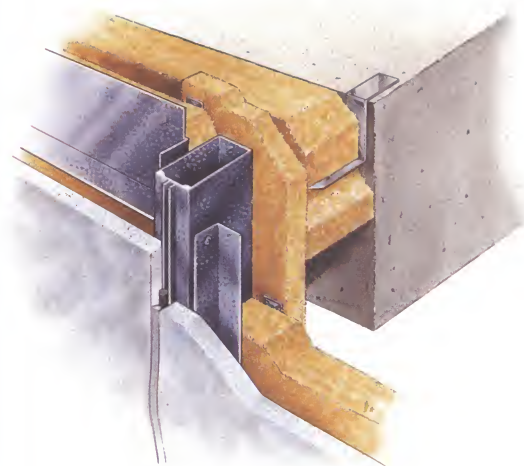
- 5 hr.1 Aluminum spandrel panel 5'x6'8", 1/8" thick, bolted to alum angle frame—2" CW-90 Curtain Wall Insulation—alum weld-on pins with speed clips approx 12" o.c.—**USG 3-29-74**
- 2 hr. Aluminum spandrel panel 4'x6'9", 0.247" thick, bolted to frame—2" CW-40 Foil Faced Curtain Wall Insulation—8d alum-nail, weld-on pins with speed clips 14" vert, 12" horiz—**USG 10-18-71**
- 2 hr. Aluminum spandrel panel 5'x6'9", 1/8" thick, bolted to frame—2" CW-90 Curtain Wall Insulation—weld-on pins with speed clips approx. 12" o.c.—**WJE 72455**
- 1 hr. Exterior aluminum and steel panel 4'5"x6'9" secured in frame—1 1/2" CW-90 Curtain Wall Insulation—impaling pins and speed clips near center and top—**USG 6-3-71**

1. Conducted to establish an end-point for THERMAFIBER insulation in a typical curtain wall assembly, but after 5 hr. 5 min. without failure or physical change (except color), test was terminated to avoid furnace damage.



Granite Curtain Wall Fire Containment

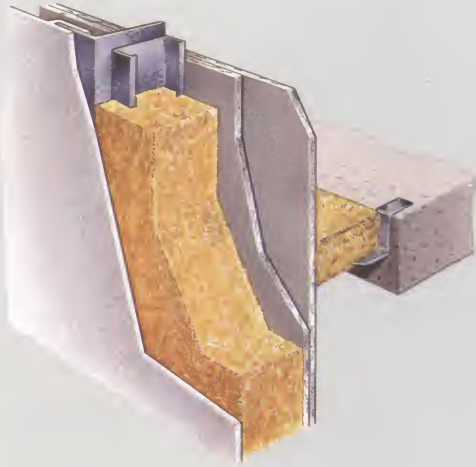
- 3 hr. Granite spandrel panel, 1 1/8" thick, kerfed top and bottom and inserted in alum extrusions secured to alum mullions at 5' o.c.—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields at 12" o.c. to 1 1/2" x 1 1/2" 20 ga. galv steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. 2" safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing compression fit and secured with safing clips modified to 1 1/2" length—**CEG 4-23-90**
- 2 hr. Granite spandrel panel, 1 1/8" thick, secured to 2 1/2"x2 1/2"x 1/4 steel angle frame 3'8"x6'6"—2" CW-90 Foil-Faced Curtain Wall Insulation—weld-on pins with speed clips spaced 12" o.c. around frame—**CEG 10-6-81**
- 2 hr. Granite spandrel panel, 1 1/8" thick, kerfed top and bottom and inserted in alum extrusions secured to alum mullions at 5' o.c.—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields at 12" o.c. to 1 1/2" x 1 1/2" 20 ga. galv steel angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" Thermafiber safing secured with safing clips—**CEG 1-15-90**
- 1 hr. Granite spandrel panel, 1 1/8" thick, inserted in alum mullion frame 3'7"x6'8"—horizontal metal furring channel between mullions—2 1/2" CW-40 Curtain Wall Insulation behind channel—3/4" SHEETROCK® brand Gypsum Panels, FIRECODE C Core, applied and screw attached to channel—**CEG 7-27-81**



Note: Technical art and text describe the test assembly in general.

Glass Fiber Reinforced Concrete Curtain Wall Fire Containment

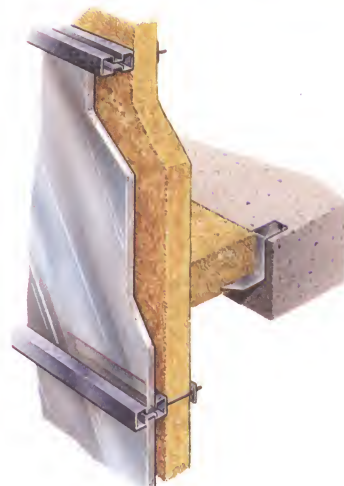
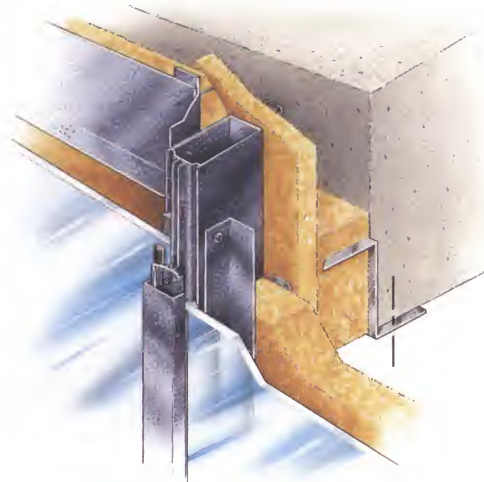
- 2 hr. GFRC spandrel panels, 6'8" $\frac{1}{4}$ "x7', $\frac{1}{2}$ " thick, framed with 4" steel studs—5" CW-40 Curtain Wall Insulation in cavity—2 layers $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw attached to GFRC studs—**CEG 4-23-82**
- 1 $\frac{1}{2}$ hr. GFRC spandrel panels, 6'8" $\frac{1}{4}$ "x7', $\frac{1}{2}$ " thick, framed with 4" steel studs—5" CW-40 Curtain Wall Insulation in cavity— $\frac{3}{8}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw attached to GFRC studs—**CEG 2-3-82**



Glass Curtain Wall Fire Containment

- 3 hr. Tempered vision-glass spandrel panel, 3'2"x6'2" $\frac{1}{2}$ ", $\frac{1}{4}$ " thick, in alum frame—2" CW-90 Dark Curtain Wall Insulation—impaled on pins secured with shields at top and bottom—**CEG-4-2-81**
- 2 hr. Tempered glass spandrel panel, 4'8"x5'9", $\frac{1}{4}$ " thick, in alum frame—2" CW-90 Foil-Faced Curtain Wall Insulation—impaled on pins secured with shields—**WJE-72481**
- 2 hr. Tempered glass spandrel panel, $\frac{3}{8}$ " thick, secured to alum mullions at 5' o.c. with pressure plates—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields 12" o.c. to $\frac{1}{4}$ " x 1 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ " alum angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" THERMAFIBER safing secured with safing clips and mechanically attached to underside of floor slab¹—**CEG 12-20-89**
- 2 hr. Tempered glass spandrel panel, $\frac{3}{8}$ " thick, secured to alum mullions at 5' o.c. with pressure plates—recessed 2" CW-90 Foil-Faced Curtain Wall Insulation screw attached with sheet metal shields 12" o.c. to $\frac{1}{4}$ " x 1 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ " alum angles screw attached to mullions—mullions covered with 6" wide, 1" thick CW-90 Foil-Faced Curtain Wall insulation screw attached 12" o.c. Safe off area between furnace and assembly was sealed with 4" thick THERMAFIBER safing topped off with 1" THERMAFIBER SMOKE SEAL compound in lieu of safing clips²—**CEG 1-16-90**
- 1 hr. Heat-strengthened black glass spandrel panel 3'3"x5'9", $\frac{1}{4}$ " thick, in alum mullion frame—2" CW-90 Foil-Faced Curtain Wall Insulation inserted in mullions—support clips at floor slab—**CEG 8-6-81**
- 1 hr. Tempered solar gray glass panel 5'1 $\frac{1}{4}$ "x6'10", $\frac{1}{4}$ " thick, set in alum mullion frame—2"x4'x5' CW-90 Curtain Wall Insulation—impaled on wire clips secured with shields 24" o.c.—**CEG 7-25-85**

1. Safing was installed from underside of floor slab using safing clip mechanically attached to underside of floor slab.
2. Because safe off area was less than 2", safing insulation was friction fit and topped off with 1" of SMOKE SEAL compound in lieu of safing clips.



THERMAFIBER safing insulation fills the void between slab edge and curtain wall insulation to contain fire. Foil-faced insulation impedes the passage of smoke and noxious gases. THERMAFIBER safing insulation also is the principal fire-resistant material used to fill poke-through openings. (See Fire/Smoke-Stop System page 5.)

THERMAFIBER safing insulation system components include 4" thick by 24" wide blankets of insulation and specially designed safing impaling clips. Blankets are field cut and installed with safing clips or wire support brackets. Strips of insulation must be cut min. $\frac{1}{2}$ " wider than the opening to assure a compression fit.

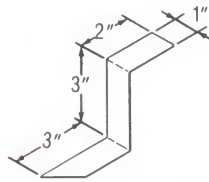
When safing is installed between the floor slab and curtain wall insulation which spans from mullion to mul-

lion, a supplementary backing/reinforcement member must be installed to prevent compression force of safing insulation from bowing curtain wall insulation.

Performance Tested In

addition to extensive fire testing, THERMAFIBER safing insulation has also been tested for sound attenuation. An assembly was constructed to simulate a 6" thick concrete floor with a 6" opening between the slab and the exterior wall. The opening was filled with 4" thick, 4-lb./cu. ft. density THERMAFIBER safing insulation covered top and bottom with steel plates. This assembly produced a rating of STC 49, outperforming an assembly where the opening was filled with 2-lb./sq. ft. lead. Filling the space with concrete produced an assembly rating of STC 54.

THERMAFIBER Safing Impaling Clip



THERMAFIBER safing insulation is the preferred forming material for UL Designs U900D, U900J, U900K, U900X, and U900Y.



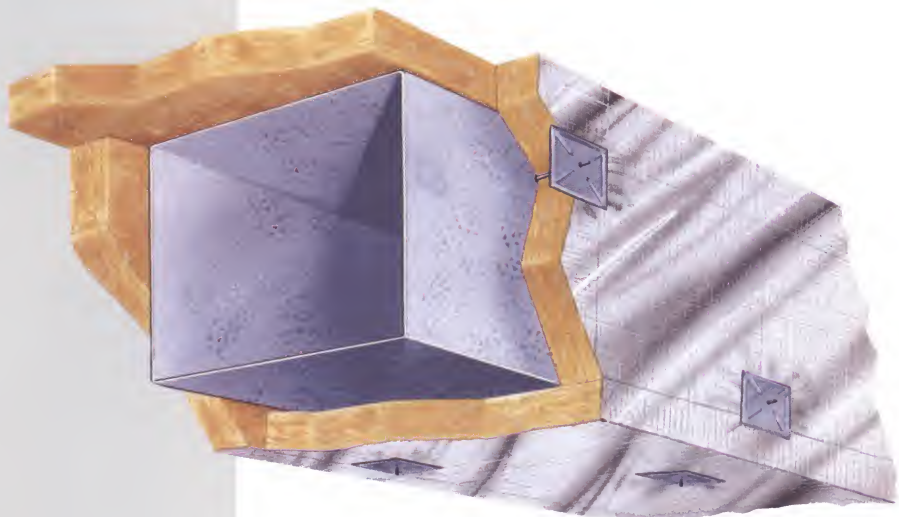
THERMAFIBER safing insulation is cut wider than the opening to assure compression fit. Installs easily with wire support brackets or safing clips. Available with foil backing to impede smoke and noxious gases.

Safing Insulation Fire Containment

3 hr. Spandrel panel containing CW insulation and forming one end of the furnace—safe off area sealed with 8"x4" THERMAFIBER safing strip—
WJE-71460

THERMAFIBER MINERAL FIBER FIREPROOFING FOR KITCHEN DUCTS

THERMAFIBER kitchen duct fireproofing protects buildings against fires that occur in kitchen grease ducts. The semi-rigid batt comes 2 $\frac{1}{2}$ " thick, 8-lb./cu. ft. density, and is faced with aluminum foil. The THERMAFIBER kitchen duct fireproofing is applied around the 16 ga. steel duct, impaled on mechanically attached pins and secured with sheet metal shields. Tested in accordance with Section 64.67(6) of the State of Wisconsin Code (CEG Report 9-12-77), assembly provides a 2-hr. rating.

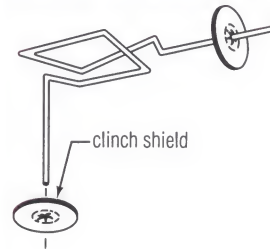


Fire can weaken structural steel framing in high-rise buildings. THERMAFIBER mineral structural fireproofing is a semi-rigid, asbestos-free felt that is non-corrosive to steel and aluminum and insulates structural framing from the heat of fire. Ease of installation and minimal clean-up make it far superior to spray-on fireproofing materials.

Eight UL designs are available with fire ratings as follows: 4-hr.—No. X304; 3-hr.—Nos. X306, N304, D301; 2-hr.—Nos. X305, N305, N304, D915, D302.

To estimate protection required for different size steel structural members, consult American Iron and Steel Institute (AISI) brochure "Designing Fire Protection for Steel Columns." AISI is headquartered in Washington, D.C.

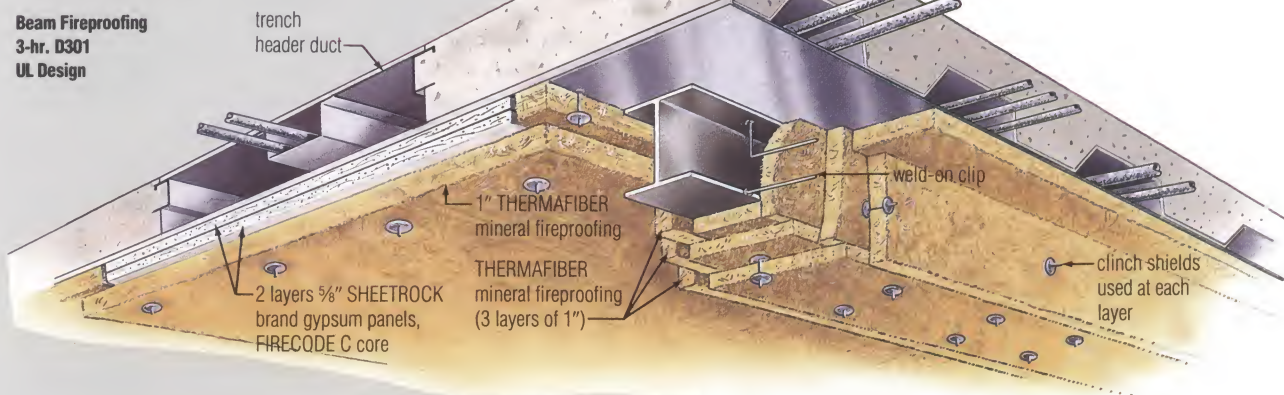
12-ga. Snap-on Flange Clip
(available from Wabash, IN)



12-ga. weld-on clips and 10-ga. cap-type stud welding pins are available from outside vendors.

Fireproofing Details

Beam Fireproofing
3-hr. D301
UL Design



Fire Ratings & UL Designs

Fire Rating	Description	UL Design No.**	Column or Beam Size
4 hr.	Mineral Fireproofing—single-layer 2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X304	W14 x228
3 hr.	Mineral Fireproofing—double-layer 2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X306	W10 x49
3 hr.†	Mineral Fireproofing—double-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units—additional pieces of mineral fireproofing stuffed between crests of fluted deck and beam.	N304	W8 x24
3 hr.††	Mineral Fireproofing—single-layer 1 1/2" thick under floor deck and trench header with double-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, under trench header—triple-layer 1 1/2" thick mineral fireproofing around beam—fireproofing and panels attached with stud welding pins and clinch shields—2 1/2" concrete on fluted steel floor units.	D301	W6 x12
2 hr.	Mineral Fireproofing—single-layer 2 1/2" thick batts around column impaled on 1/8" steel wire studs welded to column, clip-on stud or strap-attached barbed battens.	X305	W10 x49
2 hr.	Mineral Fireproofing—double-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 16" o.c. max.—3 1/4" concrete on fluted steel floor units.†	D915	W8 x13
2 hr.	Mineral Fireproofing—single-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units—additional pieces of mineral fireproofing stuffed between crests of fluted deck and beam.	N305	W8 x24
2 hr.†††	Mineral Fireproofing—single-layer 1" thick under floor deck and trench header with double-layer 5/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, under trench header—triple-layer 1" thick mineral fireproofing around beam—fireproofing and panels attached with stud welding pins and clinch shields—2 1/2" concrete on fluted steel floor units.	D302	W6 x12
1 1/2 hr.	Mineral Fireproofing—single-layer 2" thick around beam attached with stud welding pins or 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2 1/2" concrete on fluted steel floor units.	N304	W8 x24

† Restrained beam rating; unrestrained beam rating is 2 hr. †† Beam rating 4 hr. ††† Beam rating 3 hr. ** Design prefix designates columns (X), Beams (N), Floors (D)

Sound Attenuation Fire

Blankets THERMAFIBER sound attenuation fire blankets (SAFB) are effective barriers to sound transmission for improved privacy and productivity in the workplace. They are particularly useful in partitions requiring fire ratings and as overlayment for ceilings to improve acoustics.

Depending on the particular assembly and application, partition STC ratings have been improved up to nine points by installing THERMAFIBER SAFB in the stud cavity. The insulation also has been shown to improve MTC ratings for low-frequency sound attenuation, isolating sounds from machinery, mechanical equipment and music.

Drywall partitions with THERMAFIBER SAFB consistently outperform insulations with lower densities. In fact, tests conducted at Riverbank Acoustical Laboratories found that partitions with THERMAFIBER SAFB (2.5 lb/cu. ft.) provided STC ratings up to 4 points higher than partitions with ½ to 1 inch thicker glass fiber insulation (0.7-0.8 lb/cu. ft.). The added density is particularly important for isolating speech and music.

THERMAFIBER SAFB are superior to glass fiber in sound attenuation. In fact, low-density glass fiber insulation must be nearly twice as thick as standard THERMAFIBER SAFB to provide the same attenuation.

Typical THERMAFIBER SAFB Sound-Barrier Assemblies**Drywall Partitions**

	STC Rating
Steel Stud—Multi-Layer Panels	59 to 62
Steel Stud—Double Layer Panels	53 to 61
Steel Stud—Single Layer Panels	45 to 55
Wood Stud—Double Layer Panels	53 to 59
Wood Stud—Single Layer Panels	45 to 54
Relocatable	42 to 50
Area Separation Wall	47 to 60
Cavity Shaft Wall	39 to 51

Drywall Ceilings

Steel Bar Joist—Single Layer Panels	54
Steel Joist—Resilient Single Layer Panels	58
Steel Joist—Resilient Double Layer Panels	61
Wood Joist—Single Layer Panels	41
Wood Joist—Resilient Panels	52

Veneer Plaster Partitions

Steel Stud—Multi-Layer Base	59 to 62
Steel Stud—Double Layer Base	49 to 53
Steel Stud—Single Layer Base	45
Wood Stud—Resilient Base	49 to 53

Standard Plaster Partitions

Steel Stud—Gypsum Lath	49
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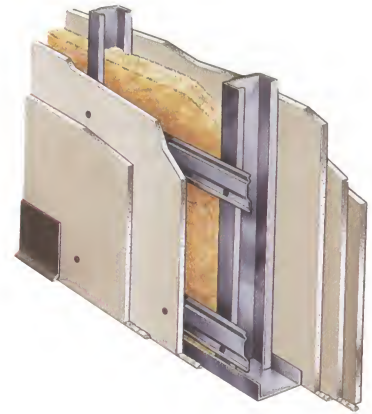
High Performance Drywall Partitions

	STC	MTC
Double Walls	69	62
Steel Stud—Resilient Panels	65	61

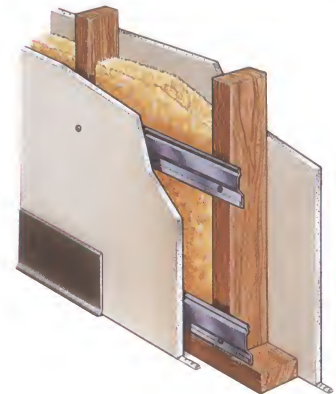
High Performance Floor/Ceiling Assemblies

	STC	MTC
Wood Joist-Resilient Double Layer Panels	58-60	53-54

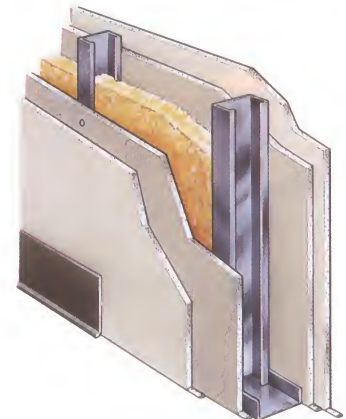
THERMAFIBER 3" SAFB with 2 layers resilient attached drywall one side, 3 layers direct attached drywall other side.
Sound test TL-87-153: 61 STC, 56 MTC.
UL Design U-455: 3-hour rating.



THERMAFIBER 3" SAFB with 1 layer resilient attached drywall one side, 1 layer direct attached drywall other side.
Sound test BBN-760903: 50 STC.
UL Design U-311: 1-hour rating.



THERMAFIBER 1½" SAFB with 2 layers direct attached drywall both sides.
Sound test SA-800421: 55 STC.
UL Design U-412: 1-hour rating.



THERMAFIBER 3" SAFB with 2 layers resilient attached drywall on ceiling side, gypsum Type F pumped flooring, carpet and pad on floor side.
Sound test TL-90-40: 59 STC, 54 MTC.
UL Design I-541: 2-hour rating.



Creased THERMAFIBER SAFB

Creased THERMAFIBER SAFB offer the most economical dry-wall sound systems in the 50 to 55 STC range. These fire-rated systems are ideal for party and corridor walls in hotels, motels, offices, and multi-family dwellings.

The creased THERMAFIBER SAFB system is a patented insulation blanket assembly that is 1" wider than regular blankets. After the blanket is installed in the partition cavity, a 1" vertical slit is field-cut partially through the center of the blanket, allowing it to be creased. Compressing the extra width into the stud cavity buckles the center, exerting pressure against both studs and drywall. This pressure dampens sound vibrations and boosts the partition's STC rating.

For example, a single-layer drywall partition with Creased THERMAFIBER SAFB has the same STC rating as an unbalanced drywall partition with standard SAFB.

As shown in the details, Creased THERMAFIBER insulation can be installed either in systems with gypsum panels attached directly to studs or in systems with resilient channel attachments. After screw attachment of SHEETROCK brand gypsum panels, joints are finished with a United States Gypsum Company joint treatment system and the partition perimeter is caulked with SHEETROCK acoustical sealant.

Sound ratings of Creased THERMAFIBER systems meet design requirements for speech privacy. Direct attachment systems achieve 51 STC (TL-85-128, Riverbank Laboratories). Resilient attachment systems achieve 55 STC (SA-850415, Shiner & Associates). Combined with veneer plaster systems from United States Gypsum Company, direct attachment Creased THERMAFIBER systems are rated 50 STC (SA-860620, Shiner & Associates), and resilient attachment systems are rated 55 STC (SA-850635, Shiner & Associates).

Single-layer construction means low in-place cost and reduced weight. Creased THERMAFIBER single-layer assemblies save material and labor compared to unbalanced gypsum drywall partitions having equivalent sound isolation. Creased SAFB assemblies also reduce dead load and save floor area.

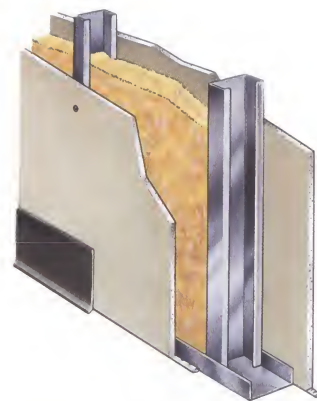
Constructed of noncombustible components, the direct attachment Creased THERMAFIBER system has achieved 1-hour fire ratings (reference UL Design U-465 for vertically applied panels; GA-WP-1200 for system with horizontally applied panels). UL Design U-465 supplies a 1-hour fire rating for the resilient system. For more complete information, request *Creased THERMAFIBER Systems*, publication IW-723.

For further information about plaster and drywall partition systems construction for sound control, consult United States Gypsum Company publications SA-919 and SA-920 in Sweet's General Building and Renovation File.

THERMAFIBER 3" Creased SAFB with 1 layer direct attached drywall on each side.

Sound test TL-85-128: 51 STC.

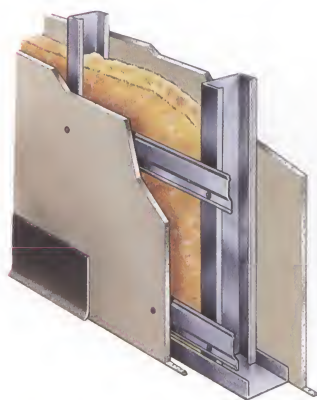
UL Design U-465: 1-hour rating.



THERMAFIBER 3" Creased SAFB with 1 layer resilient attached drywall one side, 1 layer direct attached drywall other side.

Sound test SA-850415: 55 STC.

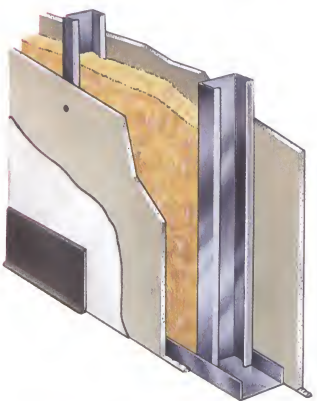
UL Design U-451: 1-hour rating.



THERMAFIBER 3" Creased SAFB with 1 layer direct attached gypsum base and veneer finish both sides.

Sound test SA-860620: 50 STC.

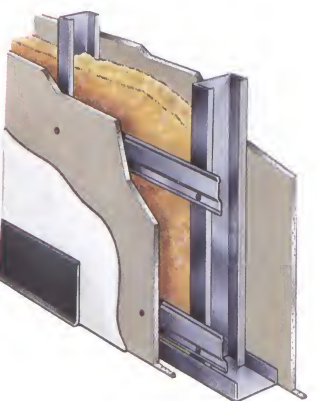
UL Design U-465: 1-hour rating.



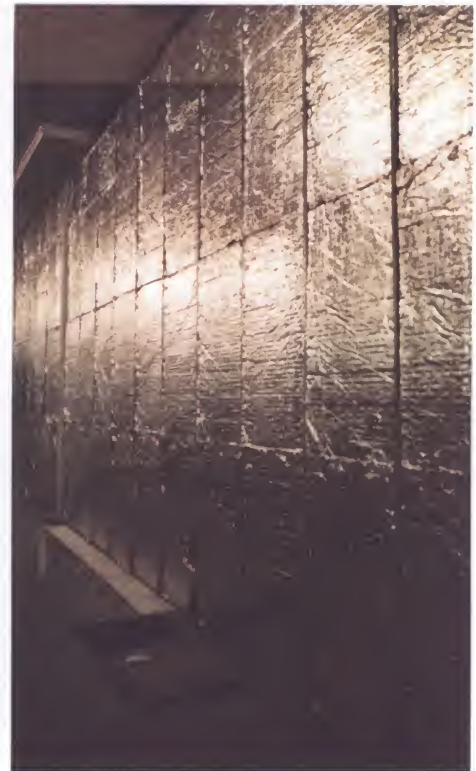
THERMAFIBER 3" Creased SAFB with 1 layer resilient attached gypsum base and veneer finish one side, 1 layer direct attached gypsum base and veneer finish other side.

Sound test SA-860635: 55 STC.

UL Design U-451: 1-hour rating.



- *THERMAFIBER FS-15 Commercial Blankets*, when installed in exterior load-bearing walls, reduce heat transmission, saving energy and improving occupant comfort. They are ideal for commercial wood- and steel-stud assemblies and exterior Z-furring. Flame spread rating is 15, smoke developed 0.
- *THERMAFIBER FS-25 Commercial Blankets* provide thermal and sound control properties and are also foil-faced with an FSP vapor retarder. They are intended for most exposed-insulation and vapor-control situations such as floor/ceilings, walls or crawl spaces. Flame spread rating is 25, smoke developed 5.



PRODUCT DATA AND INSULATING VALUE INFORMATION

Sizes & Shipping Points

Product Designation	Birmingham, AL				Wabash, IN				Tacoma, WA				Corsicana, TX			
	Standard Sizes				Standard Sizes				Standard Sizes				Standard Sizes			
	Min. Thick.	Max. Thick.	Width ⁽²⁾	Length ⁽²⁾	Min. Thick.	Max. Thick.	Width ⁽²⁾	Length ⁽²⁾	Min. Thick.	Max. Thick.	Width	Length	Min. Thick.	Max. Thick.	Width	Length
CW 40 ⁽¹⁾	2"	6"	24"	36" 48" 60"	2"	6"	24"	36" 48" 60"	2"	4"	24"	48"	2"	5"	24"	45"
CW 70 ⁽¹⁾	1½"	5"	24"	36" 48" 60"	1½"	6"	24"	36" 48" 60"	1½"	2½"	24"	48"	1½"	3"	24"	45"
CW 90 ⁽¹⁾	1"	4"	24"	36" 48" 60"	1"	5"	24"	36" 48" 60"	1"	2"	24"	48"	1"	2½"	24"	45"
Safing ⁽¹⁾	4"	4"	24"	48"	4"	4"	24"	48" & 60"	4"	4"	24"	48"	4"	4"	24"	45"
SMOKE SEAL Compound	30 oz. cartridge, 3½ & 5 gal. pails				30 oz. cartridge, 3½ & 5 gal. pails				30 oz. cartridge, 3½ & 5 gal. pails				30 oz. cartridge, 3½ & 5 gal. pails			
Mineral Fireproofing	1"	4"	24"	48"	1"	4"	24"	48" & 60"	—	—	—	—	2"	2"	24"	45"
Kitchen Duct Fireproofing	2½"	2½"	24"	48"	2½"	2½"	24"	48"	—	—	—	—	2½"	2½"	24"	45"
SAFB	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"	1"	3"	16", 24"	48"
FS-15	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"	1"	6"	16", 24"	48"
FS-25	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"	3"	6"	16", 24"	48"

NOTE: Dimension tolerances—width ±¼", length -¼" +¼", thickness -¼", +¼" (Tacoma products -½", +¾").

(1) Aluminum-foil facing, available from all plants; also dark curtain wall insulation, available from Wabash or Birmingham plants.

(2) Consult sales representative for additional sizes. SAFB density 1" = 4 lb., all others = 2.5 lb.

Thermal Resistance Values* (R = I/C)
For use in calculating heat transmission coefficients (u)

Insulation Values

Blanket Thickness	SAFB	Product & R Value	
		FS-25 (Foil Faced)	FS-15 (Unfaced)
6"	22	22	22
5 1/2"	19	19	19
3 1/2"	13	13	13
3"	11	11	11
2"	7.41	N/A	7.41
1 1/2"	5.6	N/A	5.6
1"	4	N/A	4

*Based on listings in ASHRAE Handbook of Fundamentals (1985).

Material Values

3/8" insulating sheathing	2.06	wood shingle roofing	0.94
1/2" insulating sheathing	1.32	asphalt shingle roofing	0.44
1/2" gypsum sheathing	0.45	1/2" gypsum panels	0.45
1" extruded polystyrene insulation ⁽¹⁾	5.00	3/4" plaster base	0.32
1/2" plywood	0.62	1/2" sanded plaster	0.09
3/4" plywood	0.93	1/2" plaster with light wt. aggregate	0.32
1/4" hardboard	0.34	portland cement with aggregate (per in.)	0.20
3/4" softwood (pine)	0.94	4" common brick	0.80
3/4" hardwood	0.68	4" face brick	0.44
1" x 8" wood drop siding	0.79	8" clay tile	1.85
3/4" x 10" beveled wood siding	1.05	8" concrete block with sand aggregate	1.11
exterior stucco (1" thick)	0.20	vapor-permeable felt	0.06
3/4" built-up roofing	0.33	vapor retarder plastic film	negl.

(1) Thermal resistance for extruded polystyrene insulation at 40°F mean temperature is 5.4; data based

Thermal Conductivity (according to ASTM C518)

Product Designation	"k" @75 F. btu · in./hr. · sq. ft. °F.	For insulation only																	
		1" thick		1½" thick		2" thick		2½" thick		3" thick		3½" thick		4" thick		5½" thick		6" thick	
		R ⁽²⁾	U ⁽³⁾	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U
CW 40	0.25 ⁽¹⁾	—	—	—	—	8.0	0.13	10.0	.1	12.0	.083	14.0	.071	16.0	.062	—	—	24.0	.042
CW 70	0.24 ⁽¹⁾	—	—	6.2	0.16	8.3	0.12	10.4	.095	12.5	.080	14.6	.068	16.6	.060	—	—	25.0	.040
CW 90	0.23 ⁽¹⁾	4.3	0.23	6.5	0.15	8.7	0.11	10.9	.091	13.0	.076	15.2	.066	17.4	.057	—	—	—	—
Safing	0.25	—	—	—	—	—	—	—	—	—	—	—	—	16.0	—	—	—	—	—
Mineral Fireproofing	0.23	4.3	—	6.5	—	8.7	—	10.9	—	—	—	—	—	—	—	—	—	—	—
1" SAFB	0.25	4.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other SAFB	0.27	—	—	5.6	—	7.4	—	9.3	—	11.1	—	13.0	—	14.8	—	19.4	—	22.2	—
1" FS-15	0.25	4.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other FS-15	0.27	—	—	5.6	—	7.4	—	9.3	—	11.1	—	13.0	—	14.8	—	19.4	—	22.2	—
FS-25	0.27	—	—	—	—	—	—	—	—	11.1	—	13.0	—	14.8	—	19.4	—	22.2	—

(1) Applies to both standard color and dark curtain wall insulation.

(2) R = thickness ÷ K.

(3) U value shown is for insulation only. However, in practice U values represent the overall heat transmission of all components in an assembly (U = 1 ÷ Total R).

Fire Resistance Rated noncombustible as defined by NFPA Standard 220 when tested according to ASTM E136.

Surface Burning Characteristics
(According to ASTM E84)

Product Designation	Flame Spread	Smoke Developed
CW Regular (Unfaced) ⁽¹⁾	15	0
CW Foil-Faced ⁽¹⁾	25	5
Safing Regular (Unfaced)	15	0
Safing Foil-Faced	25	5
Mineral Fireproofing (Unfaced)	15	0
Mineral Fireproofing Foil-Faced	25	5
Kitchen Duct Fireproofing Foil-Faced	25	5
FS-15 Blankets	15	0
FS-25 Blankets	25	5
SAFB	15	0
SMOKE SEAL Compound	5	0

All products have a class A interior finish rating per NFPA 101, life safety code.

(1) Applies to both standard color and dark curtain wall insulation.

Air Space Values

	Type of Surface	
	Non-Reflective	Reflective
Heat flow up		
1/2" space	0.75	1.57
3/4" space	0.77	1.66
3/8" space	0.84	2.01
Heat flow down		
1/2" space	0.91	2.54
3/4" space	1.02	3.52
3/8" space	1.22	8.17
Heat flow horizontal		
1/2" space	0.90	2.46
3/4" space	0.94	2.77
3/8" space	0.91	2.55

Based on 50° F mean temperature and 30° F temperature differential.

Air Surface Values

	Type of Surface	
	Non-Reflective	Reflective
Inside, heat flow up (still air)	0.61	1.32
Inside, heat flow down (still air)	0.92	4.55
Inside, heat flow horizontal (still air)	0.68	1.70
Outside, (15 mph wind)	0.17	—
Outside, (7.5 mph wind)	0.25	—

Product Density

Product Designation	Nom. Density —pcf	Approximate Density Tolerance—pcf ⁽²⁾			Application Method
		Corsicana Tacoma	Birmingham Wabash	Min. Thick.	
CW 40 ⁽¹⁾	4.0	±0.5	−0.5 +1.0	2"	see tests for req'd. attachment
CW 70 ⁽¹⁾	6.0	±0.75	−0.75 +2.0	1 1/2"	
CW 90 ⁽¹⁾	8.0	±1.0	−1.0 +2.0	1"	
Safing	4.0	±0.5	−0.5 +1.0	4"	brackets or safing clips
Mineral Fireproofing	9.0	±1.5	−1.5 +2.0	2", 2 1/2"	snap-on wire clips or weld-on studs
1" SAFB	4.0	±0.5	−0.5 +1.0	1"	friction fit between studs
All other SAFB	3.0	±0.5	−0.5 +1.0	1 1/2"	friction fit between studs
1" FS-15	4.0	±0.5	−0.5 +1.0	1"	friction fit between studs
All other FS-15	3.0	±0.5	−0.5 +1.0	1 1/2"	friction fit between studs
FS-25	3.0	±0.5	−0.5 +1.0	3"	friction fit between studs

(1) Applies to both standard color and dark curtain wall insulation.

(2) On package weight basis.

Products meet:

ASTM C665

Federal Specification HH-I-521F—

- Curtain Wall Insulation as Types I and III (.02 perm, tested in accordance with ASTM E96 procedure)
- Safing Insulation as Type I
- Mineral Fireproofing as Type I
- SAFB Blankets as Type I
- FS-15 Blankets as Type I
- FS-25 Blankets as Type III, Class A

ASTM C612

Federal Specification HH-I-558B—

- Curtain Wall Insulation (all) as Classes 1 and 2 (.02 perm, tested in accordance with ASTM E96 procedure)
- Curtain Wall Insulation (CW 70, CW 90) as Classes 3 and 4 (.02 perm, tested in accordance with ASTM E96 procedure)
- Safing Insulation as Classes 1 and 2
- Mineral Fireproofing as Classes 1, 2, 3 and 4

ASTM E814

UL Standard 1479

- Safing Insulation used in conjunction with SMOKE SEAL Compound

ASTM C553

- THERMAFIBER Insulations adsorb less than 1% moisture by weight and volume

Products are approved by:

New York City Board of Standards & Appeals

- Curtain Wall Insulation, .02 perm, tested in accordance with ASTM E96 procedure (under BSA 214-73-SM & accepted by MEA-209-82)

- Safing Insulation (619-48-SM & 39-74-SM)
 - Mineral Fireproofing (under BSA 619-48-SM & accepted by MEA: 70-71-M [4-hr. col.], 28-75-M [3-hr. col.], 25-74-M [2-hr. col.], 24-74-M & 138-75-M [beams])
- State of Wisconsin Code
- Kitchen Duct Fireproofing (Section 64.67[6])

GOOD DESIGN PRACTICES

- Vapor Retarders*—In air conditioned buildings in localities where high humidity and temperatures predominate, consideration should be given to placing the vapor retarder on warm or outside of wall to prevent moisture condensation within the insulation.
- Ceilings*—Insulation should be carefully fitted around—not over—recessed light fixtures. Covering fixtures with insulation causes heat to build up, which could possibly result in fire.
- Glass Spandrels*—Minimum 1" air space is required between glass spandrels and insulation behind them.
- Exterior Walls*—Penetrations in exterior walls for windows, doors, outlets, HVAC, etc., must be sealed with sealant or tape. Foil tape also should be used in foil-faced curtain wall applications to close joints and repair damaged areas. Mechanical attachment of safing and curtain wall insulation is required to avoid dislodging because of air movement, particularly in furred exterior walls without sheathing or backing.
- Test Data*—USG Interiors, Inc. will provide certified test data for published fire, sound and structural systems designed and constructed according to its published specifications. Tests are conducted on curtain wall assemblies fire-protected with these products to meet performance requirements specified by various agencies. *System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be supplied by USG Interiors, Inc. or United States Gypsum Company (THERMAFIBER sound attenuation fire blankets) and shall be installed according to current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Design Conditions

THERMAFIBER (curtain wall) (safety) (Fire/Smoke-Stop System) (mineral fireproofing) (sound attenuation fire blanket) (FS-15) (FS-25) Insulation shall be (1) (2) (3) (4) (5)-hr. fire-tested under simulated field conditions using ASTM E119 guidelines.

Part 2: Products

2.1 Life-Safety Insulation

2.1.1 Curtain Wall

THERMAFIBER mineral fiber curtain wall insulation, (CW-40)(CW-70)(CW-90), () thick, () wide, () long, type ([regular] [dark] color, unfaced, non-vapor retarding) (FSP, scrim-poly reinforced foil-facing vapor retarder).

2.1.2 Safing

THERMAFIBER mineral fiber safing insulation, regular color, (unfaced) (vapor retarding foil-faced) with galvanized steel safing clips.

2.1.3 Sealing Compound

THERMAFIBER SMOKE SEAL compound, smoke-resistant, in (30-oz. cartridges) ([3½] [5]-gal. pails).

2.2 Fireproofing Insulation

2.2.1 Structural

THERMAFIBER mineral fiber fireproofing, 8-lb./ft.³ density, (unfaced) (foil-faced), (1) (2) (2 1/2) inches thick, 24" wide by (48) (60) inches long.

2.2.2 Kitchen Duct

THERMAFIBER mineral fiber fireproofing, 8-lb./ft.³ density, (foil-faced), 2½" thick, 24" wide by 48" long.

2.3 Sound Insulation

THERMAFIBER sound attenuation fire blankets, (1) (1½) (2) (2½) (3) inches thick, (16) (24) (25) inches wide, 48" long, unfaced.

2.4 Thermal Insulation

THERMAFIBER commercial blankets, (1) (1½) (2) (3) (3½) (5¼) (6) inches thick, (15) (16) (23) (24) inches wide, () long, Type (FS-15, unfaced) (FS-25, faced).

Part 3: Execution

3.1 Curtain Wall Insulation Application

Mechanically attach CW insulation to inside of spandrel panels with fasteners approved by the architect.

3.2 Safing Insulation Application

Install THERMAFIBER safing insulation (of proper size, 2"-8" max opening, in safe-off area foil side up between THERMAFIBER curtain wall insulation and floor slabs), on safing clips spaced as needed, 24" o.c. max. (3 clips per 4" batt), leaving no voids. Cut safing wider (½" min.) than opening to insure compression fit. Compress or install on wire hangers in all floor slab openings, to seal completely around telephone cables, ducts, piping or other utilities.

3.3 Fire-Resistant Sealant Application

Seal all joints with ¾" bead of THERMAFIBER SMOKE SEAL compound. Top off safing insulation in all poke-through openings with minimum 2" depth of THERMAFIBER SMOKE SEAL compound.

3.4 Sound Attenuation Fire Blanket Application

Install THERMAFIBER sound attenuation fire blankets in stud cavities of sound-rated partitions and where required to achieve fire-rated design. Friction fit securely between studs. Butt ends of blankets closely together and fill all voids.

3.5 Ceiling Overlayment Application

Install THERMAFIBER sound attenuation fire blankets over ceiling panels (1½" single or double layer over entire ceiling) (3" over entire ceiling) extending 48" beyond all partitions and tightly fit around all grille, hangers and other vertical penetrations.

3.6 FS-15 Application

Position THERMAFIBER FS-15 commercial blanket vertically against wall surface. Hold in place with a Z-furring channel according to directions. Position next blanket so that it abuts attached furring member, and hold in place with next furring channel.

3.7 FS-25 Application

Install THERMAFIBER FS-25 commercial blankets in stud cavities where specified. Friction fit securely between studs. Install insulation between floor joists and support blankets with wire mesh, woven tie-wire or flexible metal rods. Butt ends of blankets closely together and fill all voids. For poke-through penetrations, install THERMAFIBER safing insulation in opening.

For further information on these products, including nonstandard sizes, contact

USG Interiors, Inc.
Dept 346,
101 South Wacker Drive
Chicago, IL 60606-4385

Sales Offices

Alabama
Birmingham
(205) 849-0274

Indiana
Wabash
(219) 563-6833

Texas
Corsicana
(214) 872-3936

Washington
Tacoma
(206) 627-0379

Information on THERMAFIBER SAFB Commercial Blankets is also available from United States Gypsum Company

Sales Offices

Arizona
Phoenix
(602) 866-0795

California
Fremont
(415) 792-4400
Glendale
(818) 956-1882

Florida
Jacksonville
(904) 764-3293
Miami
(305) 557-4501

Georgia
Atlanta
(404) 393-0770

Hawaii
Honolulu
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Illinois
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(214) 490-0771
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Illinois
Chicago
(312) 606-5788

New York
Tarrytown (914) 332-8000

For health and safety information see Material Safety Data Sheet (MSDS) and Health and Safety Aspects of Man-made Fiber available from USG Interiors, Inc. and United States Gypsum Company representatives and offices.

Trademarks—The following are trademarks of USG Interiors, Inc. or a related company: FIRECODE®, RC-1, SHEETROCK®, SMOKE SEAL, THERMAFIBER®.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

USG Interiors, Inc.
Thermafiber Division
101 South Wacker Drive
Chicago, Illinois
60606-4385

SA-707/1-92
Printed in U.S.A.

USG Fire Stop System for Floor and Wall Penetrations



Economical, UL-classified systems utilizing
FIRECODE Compound and THERMAFIBER Safing Insulation

USG

Provides life-safety protection at the lowest cost in the industry

Description

The first priority in building safety is containment of both smoke and fire to the area of origin. An important part of this containment is blocking smoke and flames from passing through openings in concrete floors and gypsum panel walls—electrical and plumbing penetrations, sprinkler systems, etc. All three national building codes have firestopping requirements and fire marshals are strictly enforcing these requirements.

The USG Fire Stop System employs the newly developed FIRECODE Compound (from U.S. Gypsum Company) applied to THERMAFIBER Safing Insulation (from USG Interiors, Inc.) for a firestop system combining exceptional economy and performance. Compound provides protection from heat and smoke to temperatures over 1925°F. Seals out major causes of building fire fatalities, *smoke and toxic gas*, and the major cause of equipment damage, *water*. Also stops dust infiltration and sound leakage.

Features

Low-Cost Leader—FIRECODE Compound comes in 15-lb. bags and mixes easily with water at the jobsite. This makes FIRECODE Compound much more economical to use than competitive products, especially for large scale jobs with lots of different penetrations. One 15-lb. bag provides approx. 517 cu. in. of firestop.

Less Waste—Caulking tube products are frequently discarded with some compound left so there's costly waste. With FIRECODE Compound you mix only what's needed for the application at hand.

Long Working Life—Compound has approx. 75 min. working time; sets in 2-3 hours. Several applications can be made from each batch.

UL-Classified—FIRECODE Compound has met all of the conditions of UL 1479 and ASTM E814 in tests conducted at Underwriters Laboratories. Three different UL-classified through-penetration systems are available: No. 449, a 3-hr. fire-rated floor/wall system; No. 450, a 2-hr. fire-rated wall system; and No. 510, a 2-hr. fire-rated wall system. See page 3 for details and descriptions.

Non-Combustible—Rated non-combustible as defined by NFPA Standard 220 when tested in accordance with ASTM E136 at Underwriters Laboratories. Surface burning characteristics: flame spread 0, smoke developed 0, when tested in accordance with ASTM E84 at Underwriters Laboratories.

Tough, Durable Firestop—FIRECODE Compound forms a very tough, very durable firestop once it has hardened. Has withstood the thermal and mechanical shock of high pressure hose stream testing.

Removable—FIRECODE Compound can be removed in case of retrofit work. This is particularly important for frequently altered penetrations such as those containing telecommunication lines.

Easily Repaired—FIRECODE Compound is *autobonding*, that is, fresh compound will bond to cured compound, a big plus when making repairs due to construction damage or changes to penetrating items. The FIRECODE Compound Repair Procedure has been U.L.I. evaluated and tested to assure that the through-penetration firestop requirements of ASTM E814/UL 1479 are maintained. The simple removal of loose FIRECODE Compound and replacement with additional FIRECODE Compound is all that is required to repair a damaged through-penetration firestop.

Sound Control—FIRECODE Compound provides tight seal to prevent sound leakage that would otherwise occur through the space between the penetrant and the periphery of the opening.

Easy to Mix—FIRECODE Compound is a lightweight, low density product that mixes quickly and easily with water at jobsite. By changing the amount of water added, the consistency of the compound may be changed to suit the application at hand.

Easy Installation—No special tools are required—simply trowel FIRECODE Compound into place.

Fast-Setting—Once mixed with water, FIRECODE Compound hardens in 2 to 3 hours. And it bonds to concrete, metals, wood and cable jacketing, without the use of primers.

Easily Identifiable—Applied FIRECODE Compound dries to a pale red color which is easily seen and identified by fire marshals.

Easy Cleanup—Soap and water cleanup of tools saves time.

Paintable—Applied FIRECODE Compound may be sanded smooth and painted with either latex- or oil-based paints.



A. FIRECODE Compound mixes easily with water at jobsite. There's less waste than with caulking tube products.



B. THERMAFIBER Safing Insulation, the forming material, is fit snugly into penetration.



C. FIRECODE Compound is troweled into penetration to block particulate, fire, sound, smoke and air movement.

Limitations

- 1 FIRECODE Compound should not be applied to moist areas or areas continuously immersed in water.
- 2 FIRECODE Compound's setting action cannot be delayed or prevented by dilution with water.

Product Data—FIRECODE Compound

Physical Characteristics

Material: vinyl-type non-asbestos formulation.

Color: pale red.

Storage: up to 6 mos. under good storage conditions. Close opened bags as tightly as possible and store in a dry place.

Surface burning characteristics: flame spread 0, smoke developed 0.

Compliance with standards: rated non-combustible as defined by NFPA Standard 220 when tested in accordance with ASTM E136.

Working time: Approx. 75 min.

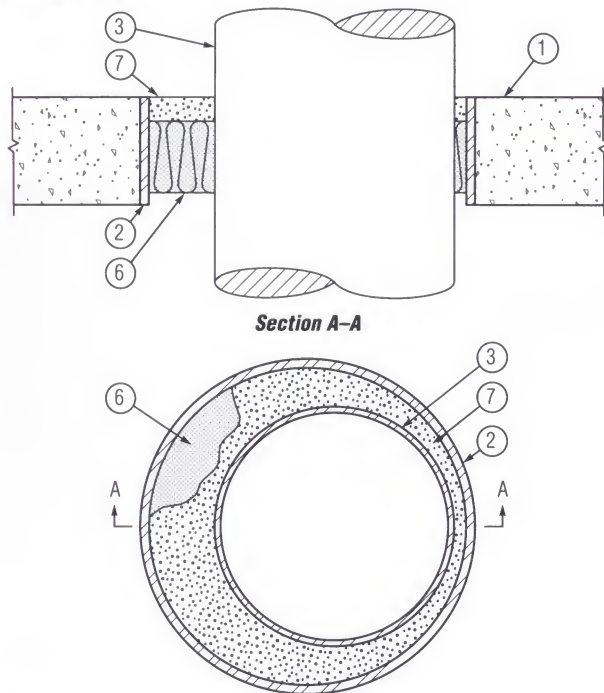
Setting time: 2-3 hours.

Freezing sensitivity: none after set.

Packaging: 15-lb. (6.7 kg) bag.

Floor/Wall Assembly—U.L. System No. 449

F Rating—3-Hr.



1. Floor or Wall Assembly—Min. 4 1/2" thick lightweight or normal weight concrete (100-150 pcf) floor or min. 5" thick concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks.

2. Steel Sleeve—(Optional) Max. 14" diameter Schedule 40 (or heavier) steel sleeves with length equal to thickness of floor or wall.

3. Metallic Pipe—Either of following may be used:

- Nominal 10" diameter (or smaller) Schedule 10 (or heavier) steel pipe. A min. 1/4" to max. 2 3/4" annular space between pipe and periphery of opening is required.
- Nominal 4" diameter (or smaller) electrical metallic tubing (EMT) or galvanized steel rigid conduit, or Schedule 5 (or heavier) steel pipe. A min. 1/4" to max. 3" annular space between pipe and periphery of opening is required.

A maximum of one pipe, tubing or conduit may be installed within the through-opening.

4. Cables—As an option to No. 3, min. 10% to max. 40% fill of max. 100 pair No. 24 AWG. telephone cables with polyvinyl chloride insulation and jacket. Cables to be rigidly supported on both sides of wall assembly. The annular space between the cables and the periphery of the opening may range from a min. 1/4" to a max. 3/4".

5. Blank—As an option to No. 3, maximum diameter of circular through-penetration opening is 8".

6. Forming Material—Min. 3" of THERMAFIBER Mineral Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

7. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound.

Approximate Coverage Rates*

Dry Powder (lbs.)	Approx. Water Additions (pts.)	Wet Mixed Compound (lbs.)	Approx. Applied Firestop (cu. in.)
1	0.5	1.5	33.6
5	2.5	7.7	172.5
7.5	3.8	11.5	257.6
10	5.0	15.4	344.9
15	7.5	23.1	517.4

* Based on approximately 7.5 pints water per 15 lb. bag for wall penetrations. For floor penetrations, approximately 8.3 pints water per 15 lb. bag is recommended and yields approximately 537 cu. in. of applied firestop.

Testing and Classification

Meets ASTM E814: Fire Tests of Through-Penetration Firestops.

Meets UL 1479: Fire Tests of Through-Penetration Firestops.

Approved Assemblies

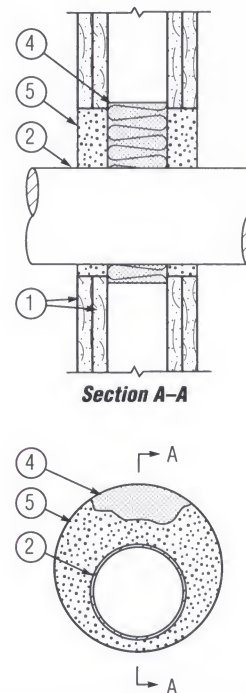
Wall Assembly—U.L. System No. 510

F Rating—2-Hr.

A nominal 4" diameter (or smaller) PVC pipe through-penetration firestop system has been evaluated and tested by Underwriters Laboratories Inc. as U.L. System No. 510. The system combines FIRECODE compound and THERMAFIBER Safing Insulation with a third-party intumescent wrap to provide adequate protection in a 2 hr. fire-resistive gypsum panel wall assembly. Refer to the 1992 ULI Fire Resistance Directory or contact U.S. Gypsum Company for complete information.

Wall Assembly—U.L. System No. 450

F Rating—2-Hr.



1. Wall Assembly—Any 2-hr. fire-resistant gypsum panel wall assembly. Joints treated with SHEETROCK Joint Tape; joints and fasteners finished with SHEETROCK Joint Compound.

2. Metallic Pipe—Either of following may be used:

- Nominal 4" diameter (or smaller) electrical metallic tubing (EMT) or galvanized steel rigid conduit, or Schedule 5 (or heavier) steel pipe. A min. 1/4" to max. 2 3/4" annular space between pipe and periphery of opening is required.
- Nominal 6" diameter (or smaller) trade size copper pipe. A nominal 1/4" annular space between pipe and periphery of opening is required.

A maximum of one pipe, tubing or conduit may be installed within the through-opening.

3. Cables—As an option to No. 2, min. 10% to max. 40% fill of max. 100 pair No. 24 AWG. telephone cables with polyvinyl chloride insulation and jacket. Cables to be rigidly supported on both sides of wall assembly. The annular space between the cables and the periphery of the opening may range from a min. 1/4" to a max. 4/4".

4. Forming Material—Min. 3" of THERMAFIBER Mineral Safing Insulation with min. density of 3.5 pcf—U.L. R-10905 label.

5. Fill, Void or Cavity Material—Min. 1" depth of FIRECODE Compound.

Good Design Practices

- 1 System Performance**—United States Gypsum Company will provide test certification for published fire and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- 2 Additional Information**—See your sales representative or refer to technical folder SA-707 *THERMAFIBER Life-Safety Fire Containment Systems* in this series.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company or USG Interiors, Inc., and shall be installed in accordance with their current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather, installation of FIRECODE Compound shall not begin until building is enclosed, with permanent heating and cooling in operation, and building temperatures maintained above 40°F. Maintain min. surface, water, mix and air temperature of 40°F during application. Adequate ventilation shall be provided to carry off excess moisture. Not to be applied to moist surfaces or areas continuously immersed in water.

Part 2: Products

2.1 Materials

- A** Forming material: THERMAFIBER Safing Insulation, unfaced, 4" thick, () wide, () long.
- B** Firestopping: FIRECODE Compound, 15-lb. bag.

Part 3: Execution

3.1 Safing Insulation Application

Clean substrate of dirt, dust, grease, oil, efflorescence, loose material or other matter.

With a serrated knife, cut THERMAFIBER Safing Insulation slightly wider than the opening. Compress and tightly fit minimum 3" thick insulation with min. density of 3.5 pcf completely around penetrant.

3.2 Firestopping Application

Mix FIRECODE Compound according to directions on bag.

Using a trowel, putty knife or spatula, scoop the compound from its container and work it into the penetration opening. Apply compound to a minimum 1" thickness on top of safing insulation. Ensure that compound is in contact with all surfaces and that entire opening is filled with safing and compound.

Sales Offices

Arizona:	Phoenix, (602) 866-0795
California:	Fremont, (415) 792-4400 Glendale, (818) 956-1882
Florida:	Jacksonville, (904) 764-3293 Miami, (305) 557-4501
Georgia:	Atlanta, (404) 393-0770
Hawaii:	Honolulu, (808) 538-7712
Illinois:	Chicago, (312) 606-5845
Indiana:	Indianapolis, (317) 848-1513
Louisiana:	New Orleans, (504) 241-2020
Maryland:	Baltimore, (301) 355-2200
Massachusetts:	Charlestown, (617) 241-8530
Michigan:	Southfield, (313) 569-1900
Minnesota:	Bloomington, (612) 854-4233
Missouri:	St. Louis, (314) 349-0980
New York:	Albany, (518) 458-7437 Oakfield, (716) 948-5287 Stony Point, (914) 786-2820
North Carolina:	Charlotte, (704) 552-7402
Ohio:	Chesterland, (216) 729-1956
Oregon:	Beaverton, (503) 626-8864
Pennsylvania:	Pittsburgh, (412) 341-2434
Tennessee:	Nashville, (615) 361-8419
Texas:	Dallas, (214) 490-0771 Houston, (713) 666-0751
Utah:	Salt Lake City, (801) 266-4975
Virginia:	Richmond, (804) 285-7528
International Division:	Chicago, (312) 606-5840

Technical Services: Contact the following offices for technical assistance concerning design, materials, systems, detailing and specifications.

Eastern Region:	Atlanta, GA (404) 393-0770 Tarrytown, NY (914) 332-8000
Western Region:	Chicago, IL (312) 606-5788 Glendale, CA (818) 956-1882

Trademarks: The following trademarks used herein are owned by United States Gypsum Company: FIRECODE, SHEETROCK, THERMAFIBER, USG.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

United States Gypsum Company
101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

USG Interiors, Inc.

SA-904

DONN[®] Ceiling Suspension Systems



USG

STANDARD COLOR CEILING SUSPENSION SYSTEMS



Canyon (067)



Desert Rose (091)



Peach (141)



Beige (142)



Sunset (100)



Mist (053)



Quartz (082)



Dusk (191)



Parchment (103)



Willow (073)



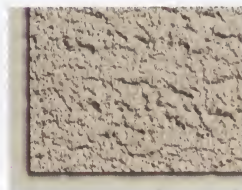
Aquamarine (081)



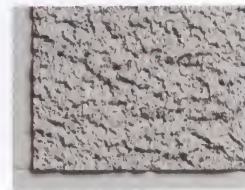
Taupe (107)



Sandstone (090)



Alabaster (104)



Silvertone (052)



Manila (246)



Fawn (181)



Melon (646)



Straw (143)



Ice Blue (093)



*Caramel (144)**



*Cranberry (099)**



*Brownstone (075)**



*Black (005)**

ADDITIONAL FINISHES FOR SUSPENSION SYSTEMS

Two shades of white and six contrasting finishes (not shown) are available as standard products. For swatches of these finishes, refer to the Up With Color Selector, or contact your USG Interiors representative.

White (004)
Flat White (050)
Brass (065)
Bronze (033)

Chrome (066)
Silver Satin (002)
Tierra Brown (092)
Woodgrain (034)

*Deeptone colors.

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DONN SUSPENSION SYSTEMS FROM USG

INTERIORS, INC. Precision engineering, modern styling and color correctness. Offering quality without compromise, the DONN line of suspension products is the most complete selection of suspension systems available in the commercial building industry.

All DONN suspension systems are designed for esthetics, strength, and fast, easy installation. In addition to visual appeal, these systems provide special features such as automatic panel centering and plug-in positive lock insertion, which save time and money.

USG Interiors is one of the world's largest commercial interior construction products companies, and the undisputed leader in ceiling suspension systems. Continuing a tradition of superior products, systems and customer service, USG Interiors brings imagination to interior designs with exciting alternatives for ceilings, walls and floors.

Color Options: USG Interiors, Inc. features the broadest line of colors in the industry. Twenty-four standard colors are available on DX®, CENTRICITEE®, FINELINE® and MERIDIAN® suspension systems. For design integrity, the same 24 standard colors are available on ACOUSTONE® and AURATONE® panels and tile from USG Interiors, Inc. If a contrasting suspension system is desired, woodgrain, metallic and other finishes are also standard. To meet precise specifications, designer colors can be custom matched to coordinate with special interior fabric, carpet and wall treatments.

Color samples to meet project needs are free upon request. Call 1-800-USG-7272 toll-free for immediate service. In Minnesota call 218-879-2800.

Color Uniformity: Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings is within normally accepted commercial tolerance.

Substrate texture, room lighting and subjectivity of observer can affect perceived color of ceiling material. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton).

These color reproductions show colors that are as close as possible within printing limitations to actual products. For a more representative match to actual production material, see product samples offered by your USG Interiors sales representative.

TABLE OF CONTENTS

Color 2

Standard Colors for Suspension Systems

INTERSECTIONS Suspension System 4

INTERSECTIONS System

INTERSECTIONS Island Trim

¾" Narrow Suspension Systems 5

CENTRICITEE®

FINELINE®

Fineline 1/8

MERIDIAN®

Highline

1½" Exposed Suspension Systems 9

DX®, DXL, DXLA

1½" Exposed Suspension Systems 9

DXW

Environmental Suspension Systems 10

ZXA, ZXLA, AX

Concealed Suspension System 11

DX Concealed Grid

Drywall Suspension System 11

RIGID X®

Compatibility with USG Interiors Ceiling Panels 12

Wall Moldings

Selection Chart

Technical Information 14

Fire-Rated Assemblies

Limitations and Good Design Practices

Architectural Specifications

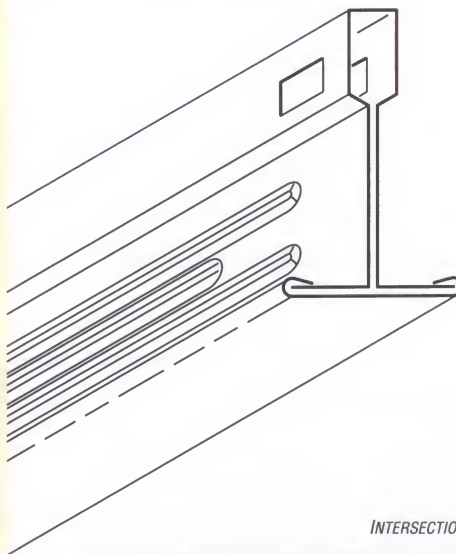
INTERSECTIONS This inventive, completely original system dramatically combines 24" x 24" and 5" x 5" modules using intersecting 29" tees. Installed at an 11½° angle to the perimeter of the space, the INTERSECTIONS system provides a unique look that cannot be achieved by any other ceiling system.

- Exciting options for the 5" x 5" squares: recessed incandescent light fixtures, accent acoustical panels, accent speaker and sprinkler inserts⁽¹⁾
- Also accepts standard 2'x2' light fixtures
- INTERSECTIONS air diffuser
- INTERSECTIONS perimeter can be finished with conventional wall molding or floated with INTERSECTIONS Island Trim
- DX profile
- Available in Flat White and 5 designer colors: Manila, Silvertone, Parchment, Taupe, Mist
- Connections meet or exceed seismic requirements for tension and compression
- System meets heavy duty load requirements⁽²⁾
- Extremely strong, rigid system
- Designed for use only with USG Interiors, Inc. acoustical panels

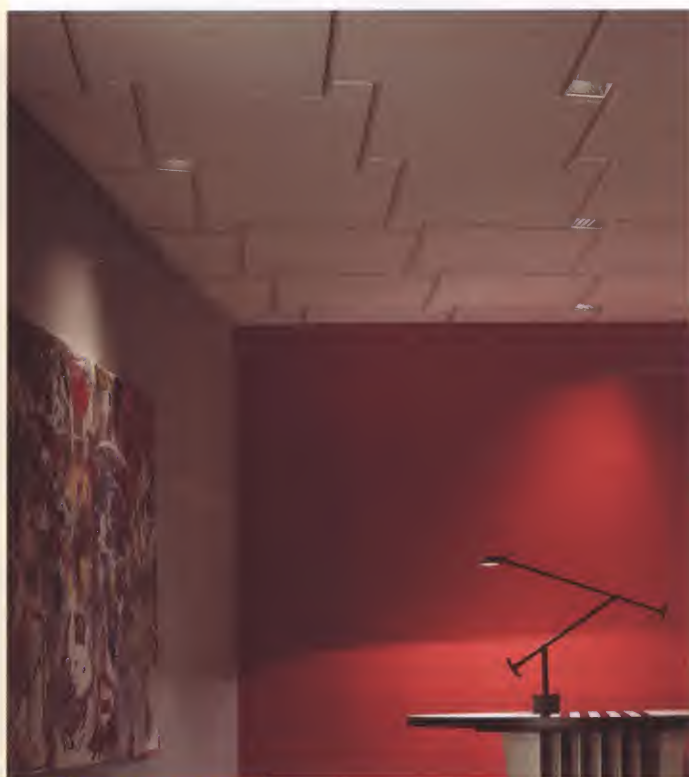
(1) Speakers and sprinklers supplied by others.

(2) When installed per instructions with 49" hanger spacing.

Item No.	Face	Length	Height
ITX29	1/4"	29"	1 1/2"



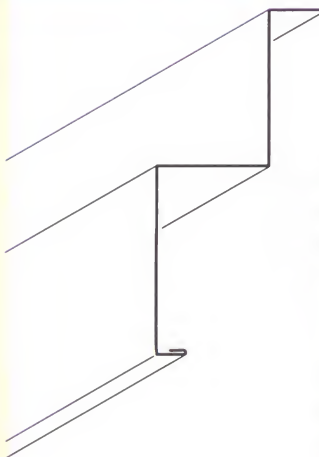
INTERSECTIONS suspension system in White.



INTERSECTIONS ISLAND TRIM

INTERSECTIONS ISLAND TRIM This trim is designed specifically for the INTERSECTIONS ceiling system.

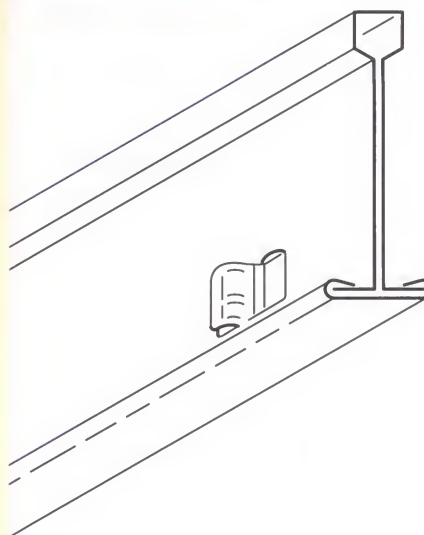
- Preserves the floating edge perimeter of the INTERSECTIONS ceiling system while giving a mitered, finished edge to frame the ceiling
- Factory engineered for tailored appearance and precise fit
- Snap-on installation



NARROW SUSPENSION SYSTEMS

CENTRICITEE Presents a subtle, $\frac{1}{16}$ " narrow-line alternative to $\frac{15}{16}$ " exposed grid. Fire-rated assemblies available up to 2 hours.

- Patented, automatic panel-centering devices built into each grid member
- Meets or exceeds all national code requirements, including seismic
- 29 standard finishes



Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXT 24	Intermediate	12'	1½"	12.2	6.6

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
DXT 218	2'	1½"	21.2
DXT 418	4'	1½"	5.0
DXT 424	4'	1½"	12.2
DXT 524	5'	1½"	6.7

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



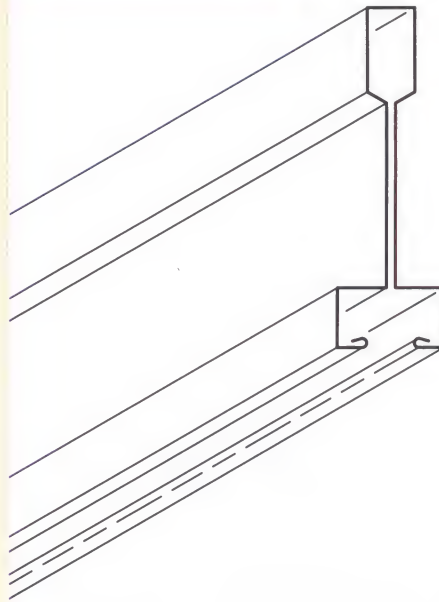
CENTRICITEE suspension in Parchment color.

FINELINE An innovative, narrow-profile, slotted ceiling grid. Its mitered intersections offer a clean, tailored appearance.

- Available in all white and white with black reveal
- Also available in 24 standard colors
- New FINELINE With Inside Color. Outside color of black or white with contrasting reveal of red, yellow, royal blue or turquoise. Effective use of bright color—perfect with black or white ceiling panels
- DONN air diffuser assemblies integrate with FINELINE grid and acoustical panels for a clean, uninterrupted ceiling plane
- Cost savings from fast assembly
- Choice of module sizes
- DX cross tee clip provides plug-in positive-lock installation without tools, and exceptional tension and compression values
- Fire-rated assemblies available

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXF 29	Intermediate	12'	1 ^{3⁄8} "	12.3	6.6	3.6
DXFH 29	Heavy Duty	12'	1 ^{3⁄8} "	16.7	8.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXF 229		2'	1 ^{3⁄8} "	59.8		
DXF 429N		4'	1 ^{3⁄8} "	13.5		
DXF 529N		5'	1 ^{3⁄8} "	6.9		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



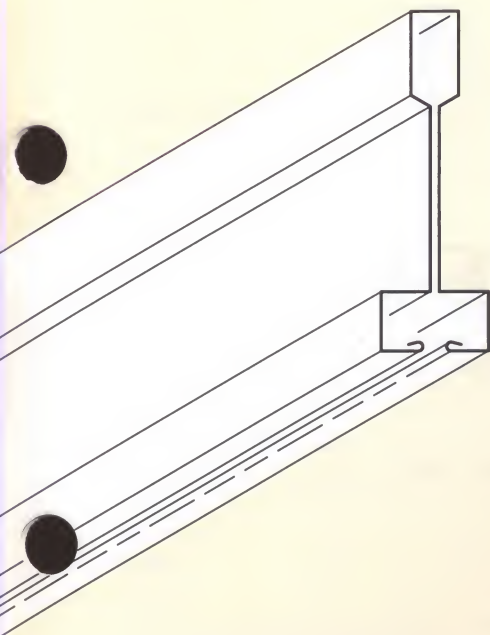
FINELINE suspension system in White.

FINELINE 1/8 A narrow-profile, slotted grid system similar to FINELINE grid, but with a 1/8" reveal rather than a 1/4" reveal.

- Available in Flat White
- Integrates with DONN brand air diffuser assemblies for a clean, uninterrupted ceiling plane
- Choice of module sizes: 2' x 2', 2' x 4', and 30" x 30"
- Intermediate and heavy duty main tees
- DX cross tee clip provides plug-in positive-lock installation without tools, and exceptional tension and compression values
- Cost savings from fast assembly
- Class A assemblies

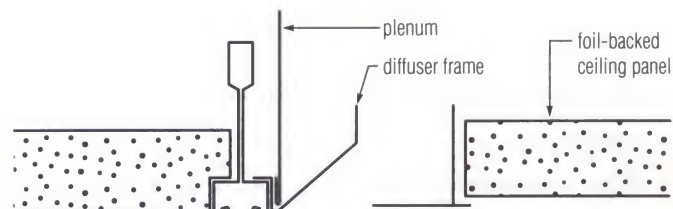
Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXFF 2924	Intermediate	12'	1 ³ / ₈ "	12.3	6.6	3.6
DXFF 2924	Heavy Duty	12'	1 ³ / ₈ "	16.7	8.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXFF 229		2'	1 ³ / ₈ "	59.8		
DXFF 429N		4'	1 ³ / ₈ "	13.5		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

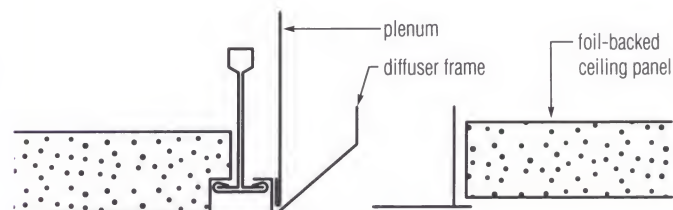


DONN AIR DIFFUSER

- Compatible with all USG Interiors 1/16" narrow suspension systems: CENTRICITEE, FINELINE, Fineline 1/8, MERIDIAN, and Highline
- Available in 1, 2, 3, or 4-slot styles



FINELINE grid



CENTRICITEE grid

FINELINE suspension system in White, integrated with DONN air diffuser assembly.

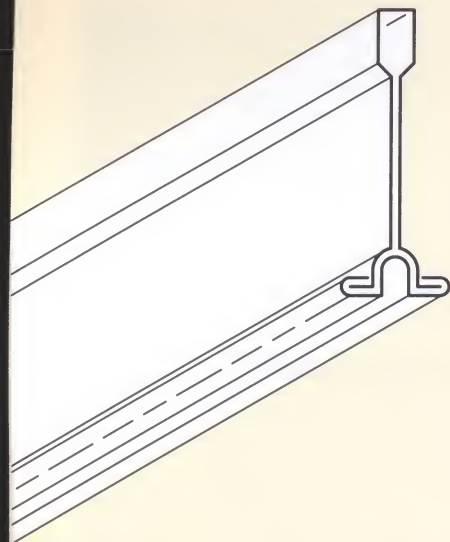


MERIDIAN Combines the esthetics of more expensive screw-slot grid with the function and utility of exposed grid. Its unique, rounded $\frac{5}{32}$ " reveal softens the effect of grid lines to enhance the finished look.

- Automatic centering of panels and light fixtures
- Exceptional pull-out tension and compression values
- Plug-in positive-lock insertion for quick installation without tools
- 31 standard finishes

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				4' Hanger Spacing	5' Hanger Spacing
Main Tee					
DXM 24	Intermediate	12'	1½"	12.4	6.5
Item No.		Length	Height	Tested Load (lbs./LF)	
Cross Tee					
DXM 224		2'	1½"	50.4	
DXM 424		4'	1½"	8.1	
DXM 524		5'	1½"	4.3	

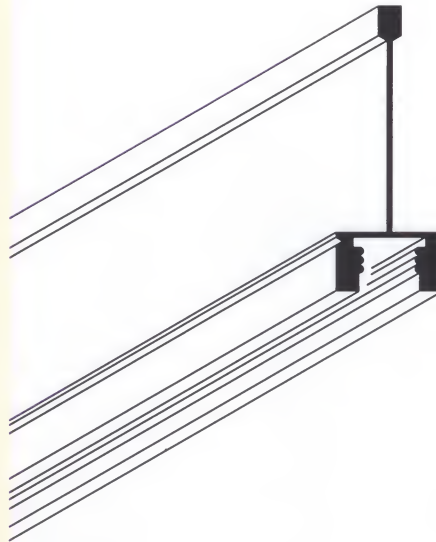
Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



HIGHLINE A narrow-faced extruded aluminum screw-slot grid with crisp edge detail.

- Smooth, medium, and heavy textures available, including the option of a contrasting black reveal
- Provides an uninterrupted reveal for a trim, finished appearance
- For complete product availability information, contact your USG Interiors representative

Item No.	Class	Length	Height
Main Tee			
HIC/HCC 3012N24	Intermediate	12'	1½"
HIC/HCC 3612N24	Heavy Duty	12'	2¼"
Cross Tee			
HIC/HCC 2424		2'	1½"
HIC/HCC 4830		4'	1½"
HIC/HCC 4830N		4'	1½"



EXPOSED SUSPENSION SYSTEMS

DX, DXL, DXLA The DX system is the most widely used acoustical suspension system. It offers maximum economy, design simplicity and access in an exposed grid system.

- **DX:** Class A $\frac{15}{16}$ " standard grid. Double web design with high tensile steel connection clips on cross tee ends
- Plug-in positive-lock insertion for quick installation without tools
- Exceptional pull-out tension and compression values without additional wires, clips or fasteners
- Meets or exceeds all national code requirements, including seismic
- Proven corrosion-resistant coating
- 32 standard finishes
- **DXL:** Fire-rated $\frac{15}{16}$ " system with more than 60 UL Designs up to 3 hours, with all the standard DX advantages
- Proven corrosion-resistant coating
- 32 standard finishes
- **DXLA:** Fire-rated $\frac{15}{16}$ " system with steel body and corrosion-resistant aluminum cap
- 29 standard finishes

DXW The DXW system offers a $\frac{1}{2}$ " wide exposed face plus all the features of $\frac{15}{16}$ " DX grid.

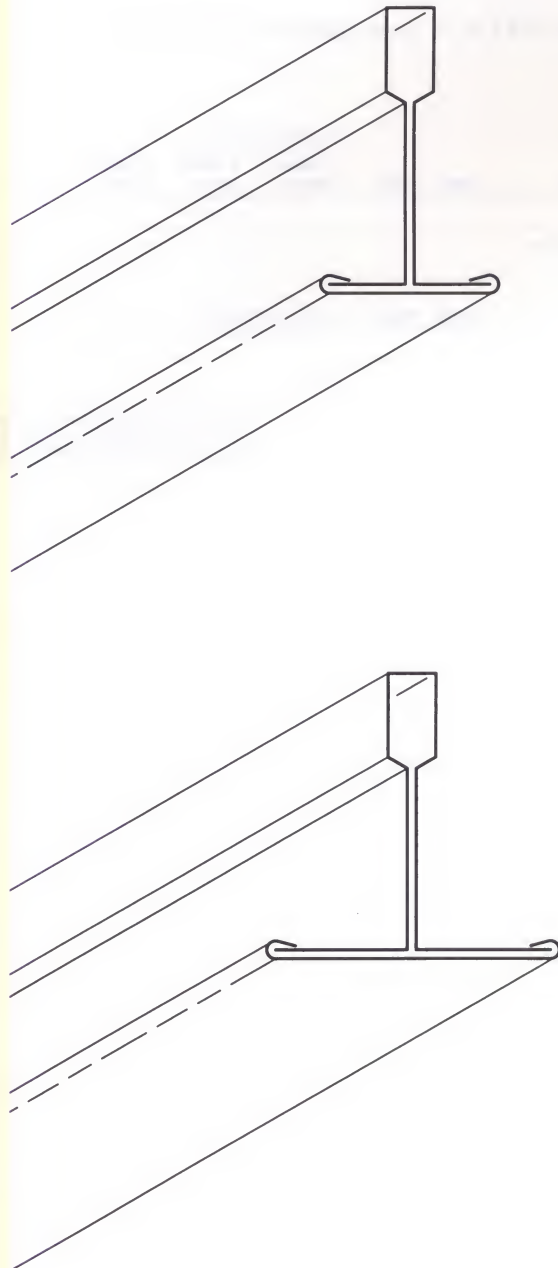
- Flat White color

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DXW 26	Heavy Duty	12'	1½"	16.3	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DXW 224		2'	1½"	65.0		
DXW 424		4'	1½"	13.7		
DXW 524		5'	1½"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
DX 24	Intermediate	12'	1½"	12.4	6.1	3.6
DX 26	Heavy Duty	12'	1½"	16.3	7.3	4.9
Item No.		Length	Height	Tested Load (lbs./LF)		
Cross Tee						
DX 216		2'	1"	17.1		
DX 316		3'	1"	10.1		
DX 416		4'	1"	5.0		
DX 422		4'	1½"	8.2		
DX 522		5'	1½"	4.3		
DX 424		4'	1½"	13.7		
DX 524		5'	1½"	6.4		

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.
For DXL/DXLA load data, see technical data offered by your USG Interiors representative.



ZXA, ZXLA Double-web hot-dipped galvanized steel body with stainless steel DX clips and painted aluminum cap for complete corrosion resistance.

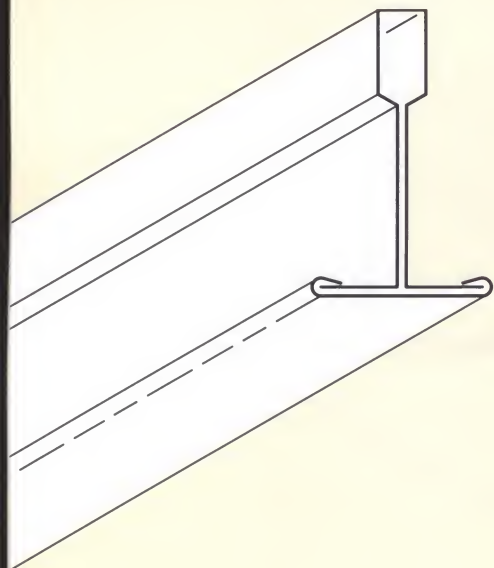
- Ideal for high humidity areas
- Strength exceeds comparable all-aluminum systems
- Cross tees with override ends resist sagging or twisting, for a professionally finished appearance
- Plug-in positive-lock insertion for quick installation without tools

Fire-rated ZXLA is accepted in all DXLA designs.

Item No.	Class	Length	Height	Tested Load (lbs./LF)		
				4' Hanger Spacing	5' Hanger Spacing	6' Hanger Spacing
Main Tee						
ZXA/ ZXLA 24	Intermediate	12'	1½	12.4	6.1	3.6

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
ZXA/ZXLA 224	2'	1½"	65.0
ZXA/ZXLA 424	4'	1½"	13.7
ZXA/ZXLA 524	5'	1½"	6.4

Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



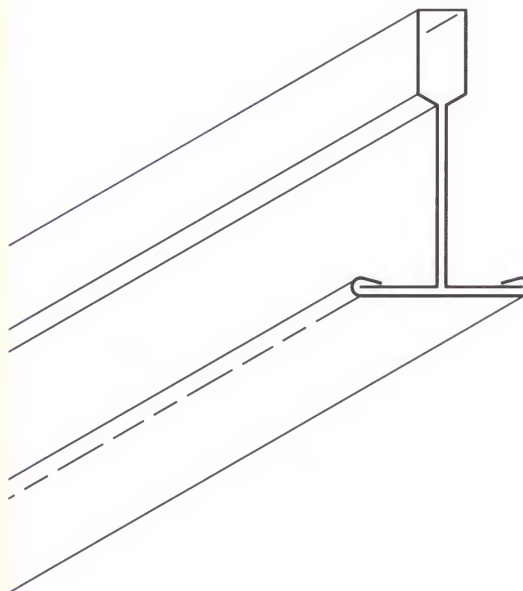
AX Double-web all-aluminum grid with stainless steel DX clips.

- Noncorrosive, easy-to-handle system for high humidity areas
- Cross tees with override ends resist sagging or twisting, for a professionally finished appearance
- Plug-in positive-lock insertion for quick installation without tools

Item No.	Class	Length	Height	Tested Load (lbs./LF)	
				3' Hanger Spacing	4' Hanger Spacing
Main Tee					
AX 26	Light Duty	12'	1½"	16.0	6.9

Item No.	Length	Height	Tested Load (lbs./LF)
Cross Tee			
AX 224	2'	1½"	22.8
AX 424	4'	1½"	5.2

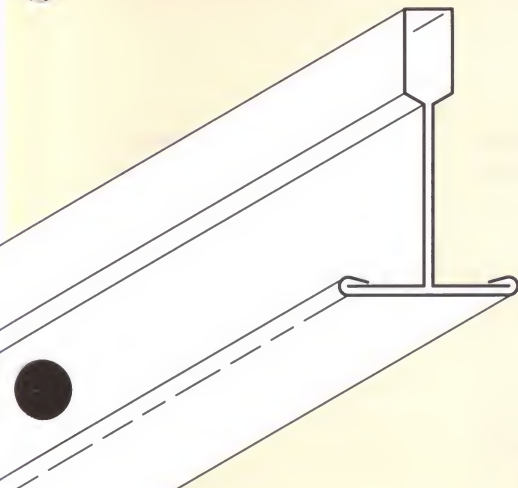
Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.



CONCEALED SUSPENSION SYSTEM

DX CONCEALED GRID The DX Concealed Grid system allows supporting grid to be completely concealed, resulting in a monolithic, uninterrupted ceiling plane.

- Concealed systems are available to accommodate a variety of upward or downward access requirements
- Light fixtures, air diffusers, and plenum access points can be arranged with great flexibility
- Fire-rated assemblies available



DRYWALL SUSPENSION SYSTEM

RIGID X This system is the ideal solution for screw-attaching drywall to a direct hung suspension.

- Combines the installation speed of grid and the durability of black iron furring channel systems into one unique system
- Accepts standard lay-in light fixtures and air diffusers
- Many fire-rated designs
- Quickly installed with modular components
- Knurled face on furring cross channels and furring cross tees for faster screw installation
- Accepts U.S. Gypsum Company SHEETROCK® brand gypsum panels

Item No.	Length	Height	Tested Load (lbs./LF)
Tee Splines			
DE 209	2'	½"	3.4
DT 316	3'	1"	10.0
DT 416/DE 415	4'	1"	5.0
DEN 416/DEN 415	4'	1"	3.0

Item No.	Length	Height	Tested Load (lbs./LF)
BPA 216	2'	1"	20.0
BPA 316	3'	1"	6.0
BPA 416	4'	1"	4.5
BPA 224	2'	1½"	35.0
BPA 324	3'	1½"	16.0
BPA 424	4'	1½"	6.0
BPA 524	5'	1½"	3.5
FCC/FCZ	2'	¾"	5.5

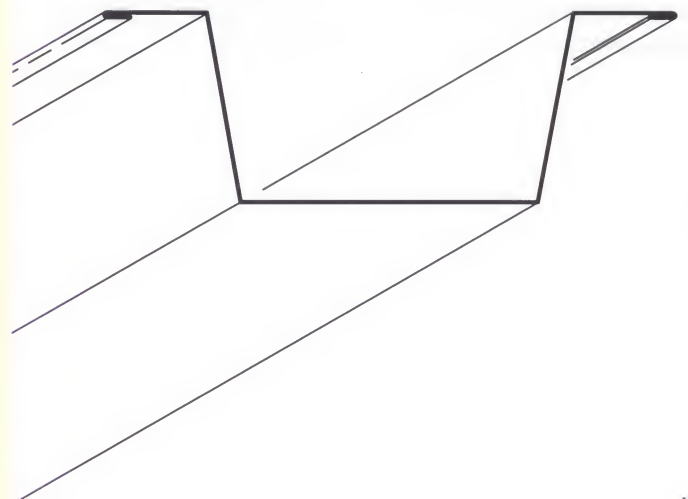
Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

Item No.	Class	Length	Height	Tested Load (lbs./LF) ¹ 4' Hanger Spacing
RMX 12	Heavy Duty	12'	1½"	17.0

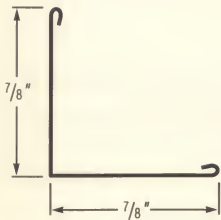
Item No.	Length	Height	Max. Allowable Load
RCX 4 Cross Channel	4'	¾"	7.4 lbs. ²
DXLG 424	4'	1½"	13.7 lbs.
DXL 424	4'	1½"	13.7 lbs.

¹ Load test data shows uniform load in lbs./LF based on simple span tests in accordance with ASTM C635 deflection limit of L/360.

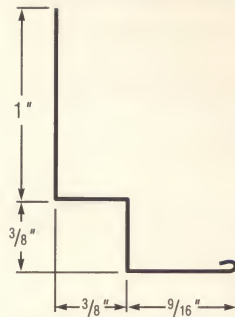
² Calculated based on moment of inertia I_{xx} .0112 in.⁴



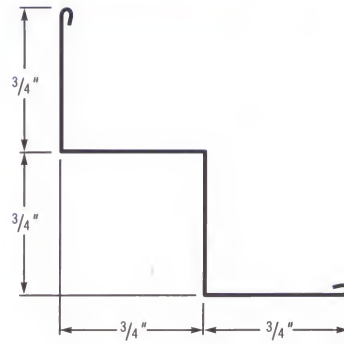
WALL ANGLES AND MOLDINGS



M7

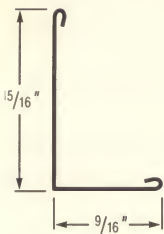


MS174

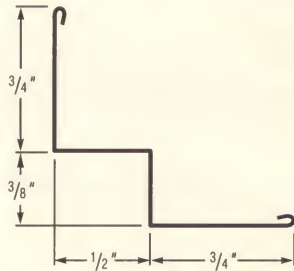


MS164

Other wall angles and moldings are available to meet specific requirements. Consult your USG Interiors representative for details.



M9

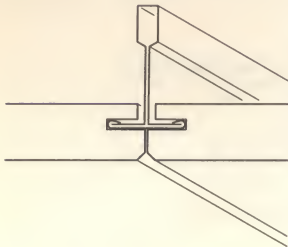


MS144

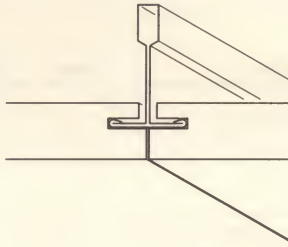
USG INTERIORS COMPATIBILITY

This Selection Chart illustrates compatible ceiling suspension systems and panel/tile edges.

TILE

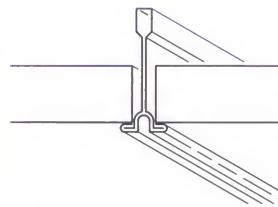


Bevel Edge Standard Kerf (BESK) Tile
DX Concealed Grid

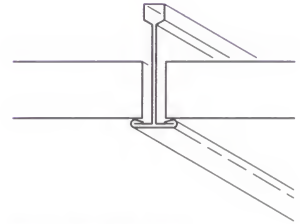


Square Edge Standard Kerf (SESK) Tile
DX Concealed Grid

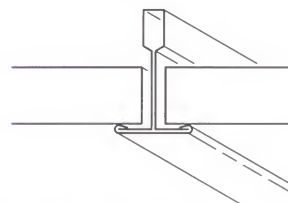
PANELS



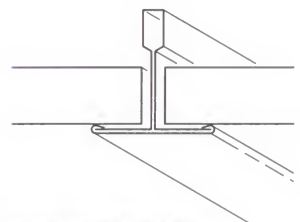
Square Edge (SQ) Panel
Meridian Grid



Square Edge (SQ) Panel
Centricitee Grid

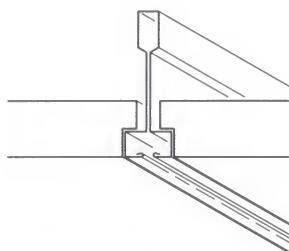


Square Edge (SQ) Panel
DX Grid

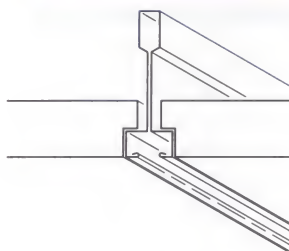


Square Edge (SQ) Panel
DXW Grid

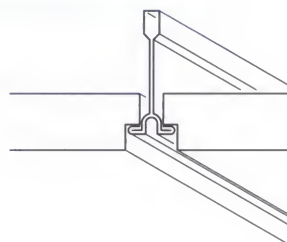
USG INTERIORS COMPATIBILITY



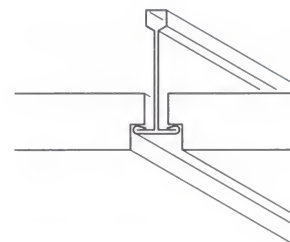
Fineline (FL) Panel
Fineline 1/8 Grid



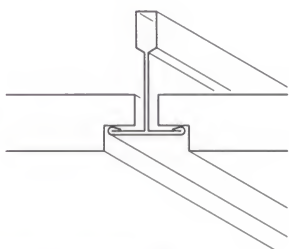
Fineline (FL) Panel
Fineline Grid



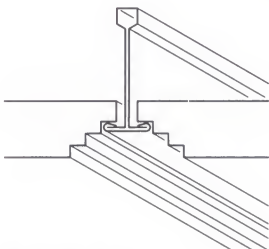
Fineline (FL) Panel
Meridian Grid



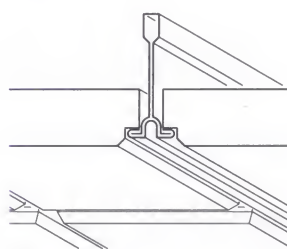
Fineline (FL) Panel
Centricitee Grid



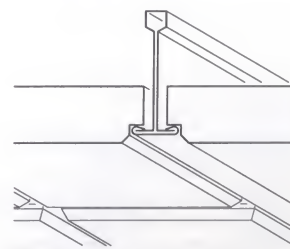
Shadowline (SL) Panel
DX Grid



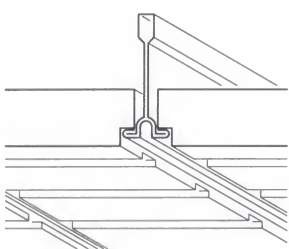
Pedestals Panel
Centricitee Grid



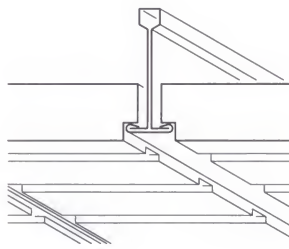
Chex/16 Panel
Meridian Grid



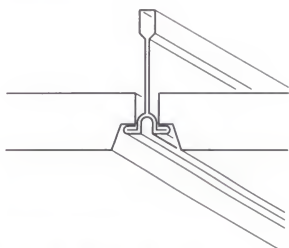
Chex/16 Panel
Centricitee Grid



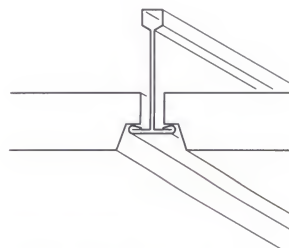
Checkmate Panel
Meridian Grid



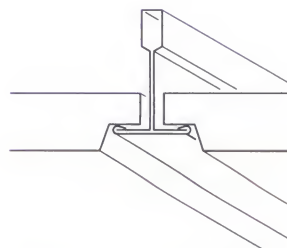
Checkmate Panel
Centricitee Grid



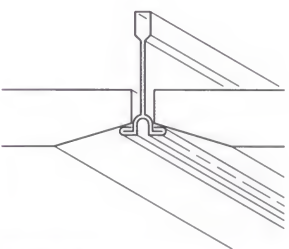
Interline Tapered (ILT) Panel
Meridian Grid



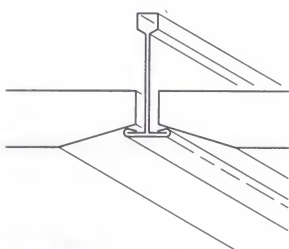
Interline Tapered (ILT) Panel
Centricitee Grid



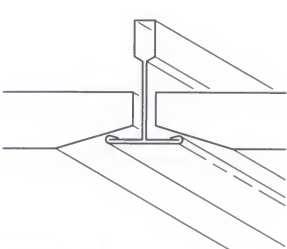
Shadowline Tapered (SLT) Panel
DX Grid



Prisms Panel
Meridian Grid



Prisms Panel
Centricitee Grid



Prisms Panel
DX Grid

From the Fire Resistance Index of Underwriters' Laboratories, Inc., Resistance Classification (Fire), Floor or Roof, Ceiling Constructions and Beam Protection.

Donn DXL/DXLA Fire-Rated Systems UL Design Numbers*

Hour Rating & UL Number	Module Size	Panel Thickness	Panel Mfr.	% Fixtures Per 100 sq. ft.	Air Openings in 1/100 sq. ft.	Concrete Thickness
Concrete on Full Cellular Deck						
2 hr.; D-215	24" x 48"	3/4"	USG Interiors	16%	113	2 1/2"
Concrete on Metal Lath						
2 hr.; G-204	24", 30" x 60" 24" x 24", 48", 36"	3/4"	USG Interiors	24% 2' x 2', 2' x 4', 20" x 60"	576	2 1/2"
2 hr. & 3 hr.; G-211	24" x 24" x 48"	3/8", 3/4"	USG Interiors	16%	113	2 1/2" (2 hr.) 3" (3 hr.)
2 hr. & 3 hr.; G-213	24" x 48"	3/8", 3/4"	USG Interiors	24%	576 (2 hr.) 154 (3 hr.)	2 1/2" (2 hr.) 3 1/2" (3 hr.)
2 hr.; G-222 (Heavy-Duty)	24" x 24"	1/2"	USG Interiors	12%	57	2 3/4"
2 hr.; G-231	24" x 24" to 30" x 60"	3/4", 3/8"	USG Interiors	16%	57	2 1/2"
1 1/2 hr.; G-259 (Heavy-Duty)	24" x 48"	1/2"	USG Interiors	16%	57	2 1/2"
1 hr.; G-201	24" x 24", 48"	3/8"	USG Interiors	8%	—	2"
Concrete on Ribbed or Corrugated Deck						
2 hr. & 3 hr.; G-211	24" x 24", 48"	3/8", 3/4"	USG Interiors	16%	113	2 1/2" (2 hr.) 3" (hr.)
2 hr. & 3 hr.; G-213	24" x 48"	3/8", 3/4"	USG Interiors	24%	576 (2 hr.) 154 (3 hr.)	2 1/2" (2 hr.) 3 1/2" (3 hr.)
2 hr. & 3 hr.; A-207	24" x 48"	3/8", 3/4"	USG Interiors	16%	113	2 1/2"
Wood Joist—2' x 10'						
1 hr.; L-206	24" x 24", 48"	3/8", 3/4"	USG Interiors	8%	110	**
Mineral Fiber on Fluted Steel Deck						
1 hr.; P-214	24" x 24", 48"	3/8", 3/4"	USG Interiors	16%	57	**
1 hr.; P-230	24" x 24", 48" or 20" x 60"	3/8", 3/4"	USG Interiors	24%	255	—
1 hr.; P-238	24" x 24", 48"	3/8"	USG Interiors	16%/24%	576	**
Foam Insulation on Fluted Steel Deck						
1 hr.; P-255	24" x 24", 48"	3/8", 3/4"	USG Interiors	24%	57	2" min.

CENTRICITEE DXLT Fire-Rated Assemblies

Concrete on Corrugated Steel Deck						
1 1/2 hr.; G-262	24" x 24"	3/8"	USG Interiors	24%	113	2 1/2"
Concrete on Metal Lath						
2 hr.; G-265	24" x 24"	3/8", 3/4"	USG Interiors	24%	113	2 1/2"

FINELINE DXLF Fire-Rated Assemblies

1 1/2 hr.; G-264	24" x 24"	3/8"	USG Interiors	24%	113	2 1/2"
1 hr. (Restrained) & 3/4 hr. (Unrestrained) P-254	24" x 24"	3/8"	USG Interiors	24%	113	N/A

RIGID X Fire-Rated Assemblies

Hour Rating & UL Number	Board Thickness	Board Manufacturer	% Fixtures Per 100 sq. ft.	Air Openings in 1/100 sq. ft.	Concrete Thickness
Concrete on Metal Lath					
2 hr. & 3 hr.; G-523	1/2", 3/8"	U.S. Gypsum (Type C)	24%	144	2 1/2" (2 hr.) 3" (3 hr.)
2 hr.; G-526	1/2", 3/8"	U.S. Gypsum (Type C)	25%	56.5	2 1/2"
2 hr. & 3 hr.; G-529	1/2", 3/8"	U.S. Gypsum (Type C)	24%	57	2 1/2" (2 hr.) 3 1/2" (3 hr.)
1 1/2 hr.; G-528	1/2", 3/8"	U.S. Gypsum (Type C)	—	—	2 1/2"
Precast Concrete					
2 hr. & 3 hr.; J-502	3/4"	U.S. Gypsum (Type C)	—	—	2" (2 hr.) 2 3/4" (3 hr.)
Wood Joists—2 x 10					
1 hr.; L-525	1/2", 3/8"	U.S. Gypsum (Type C)	24%	57	**
Plywood with Wood Truss					
1 hr.; L-529	3/8"	U.S. Gypsum (Type C)	24%	57	**
Gypsum Concrete					
1 hr. & 1 1/2 hr.; P-507	3/8"	U.S. Gypsum (Type C)	24%	57	**
Gypsum Plank, Insulation Board					
1 1/2 hr.; P-506	3/8"	U.S. Gypsum (Type C)	24%	57	**
Corrugated Steel Deck with Insulated Board or Foam Plastic Insulation					
1 hr.; P-510 & 1 1/2 hr.; P-510	1/2" 3/8"	U.S. Gypsum (Type C)	24%	57	**

*** General Notes:**

- Hanger wire should be located between the main tee splice and the expansion relief notch and a maximum 48" o.c., or per the requirements of the specific UL design.
- All 60° cross tees are to have hanger wires at their midpoint.
- Assemblies are tested with the method and criteria established in Standard UL 263, also known as A2.1, ASTM E-119 and NFPA 251.
- Hold down clips are required when the fire-rated board used weighs less than 1.0 lb./ft.²
- % Fixtures column indicates 24" x 48" fixture only, unless noted. Check for suspension requirements.
- Some designs pertain for DXL only. Contact UL Fire Resistance Directory and revisions to confirm all information listed in these tables.
- DXLR and ZXLA are also listed by UL.
- DXL has been used in many other industry fire tests and listed in reports such as the National Evaluation Reports, for example, NER-148 and NER-399 (wood truss constructions).

** Check UL Designs for deck options.

Limitations

Special Environmental Requirements

For panels in exposed grids in non-fire rated high-humidity applications, use aluminum or ZXA suspension systems. For fire-rated application, use ZXLA. For exterior applications, suspension system should be approved by manufacturer for outdoor use.

Additional DXL Fire-Rated Assemblies

3 hr.: G-229
2 hr.: A-202, D-208, G-208, G-209, G-218, G-229, G-236, G-243, G-250, G-258 [Concealed systems D-010, G-022]
1 1/2 hr.: A-210, G-229, G-241, G-243, L-208, P-207, P-225, P-227, P-231, P-251
1 hr.: G-241, L-206, L-209, L-210, L-212, P-206, P-210, P-225, P-227, P-244, P-245, P-257, P-509, P-513
3/4 hr.: P-204

Additional Rigid X Fire-Rated Assemblies

1 1/2 hr.: P-513
1 hr.: L-502, L-506, L-526, P-509

L.A. Research Report Compliance

Donn suspension systems manufactured by USG Interiors, Inc. comply with one or more of the following L.A. Research Report numbers: 22179, 23541, 24095.

- 1 **Fire-Rating**—UL fire-rated designs require: (1) FIRECODE formulation products, (2) fire-rated suspension, (3) entire ceiling installation as specified in UL Design, (4) ceiling free of overlaid material not specified in the design.
- 2 **Critical Lighting**—Do not suspend Square edge or smooth-surfaced tile in concealed systems for ceilings subjected to strong side-lighting. Strong sidelighting

with a slight angle of incidence to ceiling surface greatly exaggerates surface irregularities. It demands careful, precise installation to avoid job problems and owner complaints. Effects can be minimized by using Bevel edge or rough surface patterns instead of Square edge or smooth units, or by employing an exposed suspension. Shadows often can be

eliminated or softened with draperies or blinds.

- 3 **Dimension Uniformity**—In accordance with industry practice, all dimensions are nominal.
- 4 **System Performance**—USG Interiors, Inc. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests

are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.

ARCHITECTURAL SPECIFICATIONS

Part 1: General

1.1 Scope

Work includes suspension system, acoustical materials, and, where applicable, integrated lighting, heating, and ventilating components.

1.2 Qualifications

Suspension systems and acoustical material including all necessary hangers, grillage, splines and supporting hardware, shall be furnished and installed by an acoustical contractor.

1.3 Reference

- A ASTM C635, Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B ASTM C636, Recommended Practice for Installation of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- C ASTM C645, Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
- D ASTM C841, Standard Specification for Installation of Interior Lathing and Furring.
- E ASTM E119, Standard Methods of Fire Tests of Building Construction and Materials.
- F Underwriters' Laboratories, Inc. (UL) Fire Resistance Directory Listing and Classification.

1.4 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.5 Environmental Conditions

Building shall be enclosed with all windows and exterior doors in place and glazed, and roof watertight before installation of suspension system. Permanent heating and cooling equipment shall be in operation, and residual moisture from plaster, concrete or terrazzo work shall have dissipated. Interior temperatures shall range from 60°-80°F (15.5°-29.4°C); relative humidity shall be not more than 70%.

1.6 Sequencing/Scheduling

- A General: Coordinate with other work supported by or penetrating ceiling, including mechanical/electrical work and partition systems.
- B Mechanical work: Ductwork and heating system shall be complete before installation of suspension.
- C Electrical work: Conduit installation shall be complete before installation of suspension.

1.7 Protection

Protect completed work above suspension system from damage during installation of suspension system components.

Part 2: Products

2.9 DONN Suspension Systems By USG Interiors, Inc.:

2.9.1 Concealed (DX) (Fire-Rated DXL). Double-web main tees and (cross tees) (splines) (locking stabilizer bars). Per UL Design No. ().

2.9.2 Exposed DX. 1½" main tees and (1") (1½") cross tees, item no. (), () color. Plug-in positive-lock insertion.

2.9.3 Exposed DXW. 12' x 1½" main tees and 1½" cross tees, with 1½" face, item no. (). Plug-in positive-lock insertion. Flat White color.

2.9.4 Fire-Rated Exposed (DXL) (DXLA). 12' x 1½" main tees and (1") (1½") cross tees, item no. (), () color. Per UL Design No. (). Plug-in positive-lock insertion.

2.9.5 CENTRICITEE (DXT) (Fire-Rated DXLT). Double-web Intermediate-duty main tees with ¾" face, item no. (), () color. (Per UL Design No. [].) Panel-centering device.

2.9.6 MERIDIAN DXM. Double-web Intermediate-duty 1½" main tees with ¾" face and ½" recess, 1½" cross tees, item no. (), () color.

2.9.7 FINELINE (DXF) (Fire-Rated DXLF). Double-web (Intermediate-duty) (Heavy-duty) main tees and 1½" cross tees, ([] color) (white with optional painted [black] [red] [yellow] [royal blue] [turquoise] recess) (black with optional painted [red] [yellow] [royal blue] [turquoise] recess), item no. (). (Per UL Design No. [].) Plug-in positive-lock insertion.

2.9.8 Fineline 1/8 DXFF. Double-web (Intermediate-duty) (Heavy-duty) main tees and cross tees, Flat White color, item no. (). Plug-in positive-lock insertion.

2.9.9 Highline (HIC) (HCC). (1½" Intermediate-duty) (2¼" Heavy-duty) main tees, (1½") (1½") (2¼") cross tees, (optional painted [black] [white] recess), (smooth) (medium) (heavy) texture, item no. (), white extruded aluminum.

2.9.10 Intersections ITX Ceiling System. 1½" high tees, 29" long, installed in a basketweave, pinwheel configuration with 24" x 24" and 5" x 5" panels.

2.9.11 Environmental (ZXA) (Fire-Rated ZXLA) Grid System. 1½" double webbed galvanized steel body with painted aluminum cap and stainless steel DX clips. Meets ASTM C635 requirements for Intermediate duty suspension. Item no. () (per UL Design []).

2.9.12 Environmental AX Grid System. All-aluminum, double-web 1½" main tees and 1½" cross tees, connected with stainless steel DX clip, () color, item no. ().

2.9.13 RIGID X Drywall Suspension System. Direct-hung heavy-duty single-web steel main tees, with (furring channels) (furring cross tees) and cross tees at light fixtures. Per UL Design No. (), for (1) (1½) (2) (3) hour fire rating.

Note to specifier: Refer to product descriptions (pages 4-11) for item numbers, and to pages 2-3 for color options.

Part 3: Execution:

3.1 Installation

- A Install acoustical material and suspension system, including necessary hangers, grillage, splines and other supporting hardware, in accordance with ASTM C636 and manufacturer's instructions. Allowable tolerances per ASTM C636.
- B Space hanger wires on main tees a max. of 48" or as specified by UL Fire Resistance Directory, attaching hangers directly to structure above. Do not support wires from mechanical or electrical equipment, piping, or other equipment above ceiling. Provide additional hanger wires as required to meet seismic, fire-rating or local code requirements.

- C Install hold down clips when panels weigh less than 1.0 lbs/ft.² in fire-rated installations.
- D Install INTERSECTIONS System according to instructions supplied by USG Interiors, Inc.

3.2 Cleaning

- A Immediately remove any foreign substances (e.g., wallpaper paste), from molding and tees.
- B Repainting shall be with a paint type and application method recommended for use over metal surfaces.

3.3 Air Diffusers

- A Furnish and install air boots and air diffusers as specified in contractor documents.
- B (DONN) air diffuser assemblies required, finished to match exposed surfaces on suspension components.

3.4 Lighting

Refer to Section 16500 in Sweet's General Building & Renovation File.

For additional specifications and technical information, contact your USG Interiors sales representative.

For further information . . .

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Plaster Products, Accessories & Systems



Look to United States Gypsum Company for high quality plastering materials that provide aesthetically appealing finishes. From handsome homes to stunning commercial interiors, plastering systems from United States Gypsum Company provide superior performance and value to meet your needs.

Plasters	3-6
Veneer Basecoat and Finish Plasters	3
Basecoat Plasters	3
Finish Coat Plasters	5
Gauging Plasters	5
Finishing Limes	5
Bases and Accessories	6-10
Veneer Plaster Bases	6
Gypsum Plaster Laths	6
Metal Lath	7
Veneer Plaster Trim Accessories	9
Conventional Plaster Lath Accessories	9
Framing & Furring Accessories	10
Screws	10
Systems	11-15
Wood Framed Veneer Plaster Systems	11
Steel Framed Veneer Plaster Systems	11
Steel Framed Gypsum Lath/Metal Lath	
Channel Framing Systems	14
Performance Selector	14
Security Wall System	15
Technical Data	16-36
Construction System Selector	16
Construction Details	22
Architectural Specifications	28
Technical Literature	36



Basecoat and Finish Plasters for Veneer Plaster Systems

IMPERIAL Basecoat Plaster is a high strength basecoat plaster (3,000 psi compressive strength) for use in two-coat veneer plaster applications. IMPERIAL Basecoat can be combined with either a high-strength veneer plaster finish such as DIAMOND Interior Finish Plaster or IMPERIAL Finish but is most suitable for use with RED TOP Finish, high-strength STRUCTO-GAUGE-lime putty, RED TOP Keenes Cement-lime-sand-float finish, and RED TOP lime-gauging finishes.

IMPERIAL Basecoat is applied $\frac{1}{16}$ " to $\frac{3}{32}$ " thick to IMPERIAL Gypsum Base, directly over porous concrete block or over a bonding agent applied to monolithic concrete. The basecoat surface must be left rough and open to achieve proper bond and suction for finishing of the finish coat. It is available in formulations for hand application or a patented machine spray application. Complies with ASTM C587.

DIAMOND Veneer Basecoat Plaster provides quality walls and ceilings for residential construction where the superior strength of IMPERIAL Basecoat Plaster is not essential. Its superior workability provides ease and speed of application to achieve a high production rate with increased coverage. Produces a base that esthetically enhances the finish by providing regulated suction, resulting in exceptional integral bond. It is applied from $\frac{1}{16}$ " to $\frac{3}{32}$ " thickness to IMPERIAL Gypsum Base, to porous concrete block, or to bonding agent on monolithic concrete surfaces. Once basecoat is applied and has become firm, surface is raked or broomed to provide a rough and open surface for the finish coat. Available only for conventional hand-tool application. Complies with ASTM C587.

IMPERIAL Finish Plaster is applied to a nominal $\frac{1}{16}$ " to $\frac{3}{32}$ " thickness over IMPERIAL Gypsum Base in one-coat veneer plaster systems. IMPERIAL Finish Plaster can also be applied over IMPERIAL Basecoat in two-coat veneer plaster systems. However, this combination yields lower productivity and a surface where it is harder to achieve a smooth trowel finish compared to other prepared plaster finishes. IMPERIAL Finish offers the highest strength (3,000 psi compressive strength) which provides the most abrasion-resistant finish of any plaster finish. In an abrasion resistance test when finish was scoured 1,000 times with a 25-lb. weighted brush, penetration into the IMPERIAL Plaster Finish was never more than one millimeter. It requires only the addition of clean water. IMPERIAL Finish is particularly suited for hard-wear locations where the ultimate in strength, abrasion-resistance and durability are desired. Complies with ASTM C587.

DIAMOND Interior Finish Plaster offers a strong, hard white surface for commercial or residential construction where the extra hardness of IMPERIAL Finish is not required. It is suitable as a single-coat finish directly on IMPERIAL Gypsum Base or over a bonding agent on monolithic concrete; also as a second coat of a two-coat veneer system over IMPERIAL or DIAMOND Basecoats or a sanded gypsum basecoat.

Application to a nominal $\frac{1}{16}$ " to $\frac{3}{32}$ " thickness is fast and easy. DIAMOND Interior Finish is unaggregated for smooth or skip trowel finishes; may be job-aggregated with up to an equal part by weight of clean silica sand for Spanish swirl, float or other types of textures. Can be applied in electric cable heating systems if properly job-sanded.

Painting or further decoration of DIAMOND Interior Finish Plaster is recommended and should be specified. However, in many residential applications, DIAMOND Interior Finish Plaster provides a uniform white color and may satisfy a job's specific acceptance specifications if skip-trowel and floated textured finishes are utilized. DIAMOND Interior Finish Plaster is formulated to allow quick drying and can be decorated, when thoroughly dry, with a latex base

or breather-type paint. Under ideal conditions, painting can take place in as little as 24 hours which minimizes costly delays and speeds occupancy.

Ideal for upgrading residential and commercial construction, and for applications where fast completion, durability, and aesthetic versatility are important. Competitive in cost in many areas to taped and finished drywall. Also suitable for use in radiant heat ceilings. Not recommended for use over portland cement basecoats or masonry surfaces. Complies with ASTM C587.

IMPERIAL Basecoat and Finish—Approximate Coverage Rates

Product	ft ² /ton		m ² /ton (metric) ⁽¹⁾	
	Gypsum base	Masonry	Gypsum base	Masonry
IMPERIAL Basecoat	3250-4250	2700-3600	335-435	275-370
DIAMOND Basecoat	4000-5000	3500-4500	410-510	360-460
IMPERIAL (1-coat) Finish	3500-4000	Not recommended	360-410	Not recommended
IMPERIAL (2-coat) Finish	3200-3600	Not applicable	330-370	Not applicable

(1) Coverage rounded to nearest 5m² per metric ton.

DIAMOND Interior Finish—Approximate Coverage Rates

Product	Neat		Sand float finish sanded 1:2 (sand: DIF) ⁽¹⁾		Heavy texture finish sanded 1:1 ⁽¹⁾	
	ft ² /ton	m ² /ton ⁽²⁾	ft ² /ton	m ² /ton ⁽²⁾	ft ² /ton	m ² /ton
IMPERIAL Gypsum Base	6000	610	4660	475	3500	355
IMPERIAL or DIAMOND Basecoat	5500	560	4330	440	3250	330
Sanded RED TOP Basecoat	5000	510	4000	410	3000	305
Monolithic concrete	5500	560	4330	440	3250	330

(1) Coverage based on one ton of aggregated mixture (combined weight of sand and DIAMOND Finish).

(2) Coverage rounded to nearest 5m² per metric ton.

Basecoat Plasters for Conventional Plaster Systems

RED TOP Gypsum Plaster requires adding aggregate and water on the job. It complies with ASTM C28, and is supplied in three types:

Regular—for sand aggregate, hand application.

LW—for lightweight aggregate, hand application.

Machine Application—for sand or lightweight aggregate (with perlite lightweight aggregate, do not machine-apply through a hose longer than 150', or lift vertically over 30').

RED TOP Wood Fiber Plaster is a gypsum plaster containing fine particles of selected wood fiber. It is strongly recommended as a scratch coat for metal lath, but can be used on all standard laths and masonry. Wood fiber plaster normally requires adding only water. A 1 cu-ft volume of sand per 100 lb of plaster must be added when machine applied or used directly on masonry, and may be added when used as a scratch or brown coat. It complies with ASTM C28.

RED TOP Two-Purpose Plaster is a gypsum plaster, for either hand or machine application, that requires adding aggregate and water on the job. It complies with ASTM C28, is suitable for sand or lightweight aggregates meeting ASTM C35 (with perlite lightweight aggregate, do not machine-apply through a hose longer than 150', or lift vertically over 30').

STRUCTO-BASE Gypsum Plaster develops higher strengths than conventional plasters, for security walls, handball courts, hospital corridors, high-performance suspended acoustical ceiling systems, schools, and wherever the ultimate compressive strength plaster is necessary. It complies with ASTM C28 for "gypsum neat plaster" and provides a 2,800 psi compressive strength when tested in accordance with ASTM C472 using two parts of standard Ottawa sand. Available in **Regular** for hand application and **MA** for machine application.

STRUCTO-LITE Gypsum Plaster weighs less than half as much as a sanded base coat. Has a "k" factor of 1.74. This ready-mixed, perlite-aggregated plaster provides three times the insulation value of sanded plaster, at an overall cost comparable to job-mixed lightweight aggregate plaster. It may be sand-float finished or used as a base for acoustical tiles. Smooth trowel finishes may be achieved over STRUCTO-LITE Plaster provided the lime-gauging finish plaster contains fine aggregate or aggregated gauging plaster and the lath is not metal lath. It complies with ASTM C28 for gypsum ready-mixed plaster, and requires adding only water on the job. Formulated in three types:

Regular—for gypsum or metal lath.

Masonry—for unit masonry only (high suction).

Type S—required for UL fire-rated Designs D401 and U402 (consult U.S. Gypsum for availability).

STRUCTO-LITE Gypsum Plaster Limitations: (1) not recommended for use as basecoat in conjunction with a non-aggregated smooth trowel finish where metal lath is the plaster base; (2) not recommended for machine application through a hose longer than 150', or lifting vertically over 30'.

Basecoat Plaster General Limitations

- Where sound isolation is the prime consideration, use sand aggregate only.
- With application over interior monolithic concrete, a high-quality plaster bonding agent is required before plastering and the basecoat surface must be serrated or broomed to roughen and open the surface to allow for proper suction and keying of the finish coat to bond.
- Gypsum plasters should not be used where they will come in contact with water or excessive moisture. May be applied to exterior soffits protected from direct exposure to rain and moisture, and have suitable drips and casings along the edges.
- Plaster application on masonry or concrete walls, or ceilings that have been coated with bituminous compounds or other waterproofing agents, is not recommended. Interior of exterior walls shall be furred and lathed prior to plastering to prevent seepage and condensation.
- The only United States Gypsum Company plaster recommended for the embedment of electric heat cables is job-sanded DIAMOND Interior Finish applied directly to properly prepared monolithic concrete or IMPERIAL Gypsum Base. If IMPERIAL Gypsum Base and job-sanded DIAMOND Interior Finish Plaster are used for a radiant heat system, the cable-sheath operating temperatures must never exceed 125°F.
- Basecoats containing job-mixed lightweight aggregate or STRUCTO-LITE Gypsum Plaster must be finished with an aggregated finish plaster.

Technical Data

Thermal Coefficient of Expansion (unrestrained) [Inches/inch/°F. (40°—100°F.)]

Sanded Gypsum Plaster (100:2, 100:3)	7.0x10 ⁻⁶
Wood Fiber Plaster (sanded 100:1)	8.0x10 ⁻⁶
Gypsum Lath	9.0x10 ⁻⁶

Hygrometric Coefficient of Expansion (unrestrained) [Inches/inch/%R.H. (5%—90%R.H.)]

Gypsum Lath	7.2x10 ⁻⁶
Sanded Gypsum Plaster (100:2, 100:3)	1.5x10 ⁻⁶
STRUCTO-LITE Plaster (regular)	4.8x10 ⁻⁶
Vermiculite Gypsum Plaster (100:2)	3.8x10 ⁻⁶
Wood Fiber Plaster (sanded 100:1)	2.8x10 ⁻⁶

Basecoat Plasters

		Ratio: aggregate (vol.) basecoat (wt.)		Approx. compressive strength dry ⁽¹⁾	Weight pcf —dry	Conductivity (k)	
Plaster product	Mix	ft ³ /100 lb	m ³ /t				
STRUCTO-LITE	regular	—	—	700	49	50	1.74
RED TOP Wood Fiber	neat sand	— 1.0	— 0.62	1750 1400	123 98	82 97	3.15 —
STRUCTO-BASE	sand	2.0	1.24	2800	197	124	—
	sand	2.5	1.55	1900	134	120	—
	sand	3.0	1.86	1400	98	118	—
RED TOP Gypsum and Two-Purpose Plasters	sand	2.0	1.24	875	62	107	5.51
	sand	2.5	1.55	750	53	108	—
	sand	3.0	1.86	650	46	109	5.60
	perlite	2.0	1.24	700	49	48	1.64
	perlite	3.0	1.86	525	37	41	1.31
	vermiculite	2.0	1.24	465	33	48	1.74
	vermiculite	3.0	1.86	290	20	41	1.42

(1) Average laboratory results when tested in accordance with ASTM C472. Figures may vary slightly for products from individual plants.

Basecoat Plasters—Approximate Coverage Rates

Plaster product	Mix	Ratio: aggregate (vol.) basecoat (wt.)		Approx. coverage per ton of gypsum basecoat ⁽¹⁾					
		ft ³ /100 lb	m ³ /t	Gypsum lath		Metal lath		Unit masonry	
				yd ² /ton	m ² /ton ⁽³⁾	yd ² /ton	m ² /ton ⁽³⁾	yd ² /ton	m ² /ton ⁽³⁾
STRUCTO-LITE	regular	—	—	140	129	89 ⁽²⁾	82 ⁽²⁾	109	100
RED TOP Wood Fiber	neat	—	—	85	78	54	49	66	60
RED TOP Wood Fiber	sand	1.0	0.62	135	124	86	79	105	97
STRUCTO-BASE	sand	2.0	1.24	154	142	99	91	120	110
	sand	2.5	1.55	185	170	118	109	144	132
	sand	3.0	1.86	214	197	136	125	167	154
RED TOP Gypsum and Two-Purpose Plasters	sand	2.0	1.24	180	165	114	104	140	129
	sand	2.5	1.55	206	190	131	121	160	147
	sand	3.0	1.86	232	213	148	136	181	167
	perlite	2.0	1.24	176	162	112	103	137	126
	perlite	3.0	1.86	224	206	143	132	174	160
	vermiculite	2.0	1.24	171	157	109	100	133	123
	vermiculite	3.0	1.86	215	198	137	126	168	154

(1) Grounds (including finish coat): gypsum lath—1/2" (face of lath), metal lath—3/4" (back of lath), unit masonry—5/8". (2) Lightweight aggregate plasters are not recommended over metal lath when the finish coat is to be smooth troweled. (3) Metric ton.

Note: Coverage values based on laboratory determined dry densities. Actual coverage may vary due to job conditions.

Use of Aggregates with Gypsum Plasters maximum recommended proportions

Plaster base	No. of coats	Type of coats	Maximum aggregate quantity, cu. ft., to be used with 100 lb. of neat gypsum plaster					
			Under smooth trowel finishes			Under texture finishes		
			Sand ⁽¹⁾		Perlite ⁽²⁾	Sand ⁽¹⁾		Perlite ⁽²⁾
			ft ³ /100 lb	m ³ /t	ft ³ /100 lb	m ³ /t	ft ³ /100 lb	m ³ /t
gypsum lath	3	scratch brown	2	1.24	2	1.24	2	1.24
			3	1.86	2	1.24	3	1.86
	2	basecoat	2.5	1.55	2	1.24	2.5	1.55
metal lath	3	scratch brown	2	1.24	—	—	2	1.24
			3	1.86	—	—	3	1.86
unit masonry	3	scratch brown	3	1.86	3	1.86	3	1.86
			3	1.86	3	1.86	3	1.86
	2	basecoat	3	1.86	3	1.86	3	1.86

(1) Approximately six No. 2 shovels of sand equal 1 cu. ft. (0.028m³). (2) In a construction with metal lath as the plaster base, perlite or vermiculite aggregate is not recommended for use in the basecoat plaster, unless a float finish is used. (3) Quantity recommended only if plaster is applied 1" thick; otherwise use 2 ft.³.



Finish Coat Plasters

Pre-mixed Finish Plasters

RED TOP Finish is a mill-mixed, gauged interior finish plaster which offers excellent troweling characteristics. Requires adding only water on the job with two formulations available.

Regular Set—for use with conventional sanded gypsum basecoats.

Quick Set—for use with IMPERIAL Basecoat Plaster and DIAMOND Veneer Basecoat Plaster.

Limitation: not recommended with lightweight aggregate gypsum basecoats.

ORIENTAL Exterior Stucco Finish is an all-weather exterior water-resistant portland cement based plaster finish, available white or in 15 other colors (Southwest only). Compatible only with portland cement-lime base coats. It is mill-prepared, requires adding only water to ready it for hand or spray application of float, texture, stipple, sponge, spatter-dash or rough coat (but not smooth trowel) finishes.

Gauging Plasters

CHAMPION and STAR White Gauging Plasters are, respectively, conventional quick-set and slow-set plasters, complying with ASTM C28, supplied in two formulations:

Unaggregated—for sanded base coats.

Quality—with perlite or sand fines, for lightweight aggregated base coats.

RED TOP Gauging Plaster is identical to CHAMPION and STAR Plasters, including ASTM C28 compliance, except slightly darker in color.

STRUCTO-GAUGE Gauging Plaster provides extreme hardness, high strength and resistance to surface abrasion, but must be used only over high-strength base coats: wood fiber, sanded gypsum, STRUCTO-BASE or IMPERIAL. Complies with ASTM C28 and achieves a 5,000 psi compressive strength when tested (neat) without the addition of finish lime. Available in Quick or Slow Set formulations.

RED TOP Keenes Cement is capable of extreme surface hardness and resistance to surface abrasion. The hardness is achieved by extensive troweling (except in regular sand float finishes), which densifies the surface. Ideal for float finishes and job coloring. It is a dead-burned gypsum gauging plaster—the only retemperable gauging plaster—complying with ASTM C61.

Gauging Plasters—Approximate Coverage Rates

Product	Finish texture	Gauging to lime, to sand (dry wt.)	Approx. coverage, per ton (sq. yds.) ⁽¹⁾
STRUCTO-GAUGE and Lime Finish	smooth trowel-extremely hard surface	100 lbs. gauging 100 lbs. lime	380
	smooth trowel-hard surface	100 lbs. gauging 200 lbs. lime	430
Keenes Cement Lime Finish	smooth trowel	200 lbs. Keenes 100 lbs. lime	370
Keenes Cement Lime and Sand Finish	float finish	100 lbs. Keenes 200 lbs. lime 800 lbs. sand	270
Gauging Plaster Lime Finish	smooth trowel	50 lbs. gauging 100 lbs. lime	390
Gauging Plaster, Lime and Sand Finish	float finish	50 lbs. gauging 100 lbs. lime 400 lbs. sand	280

(1) 1/16" thick.

Finishing Limes

IVORY and SNOWDRIFT Finish Limes. Autoclaved double-hydrate lime virtually eliminates possible future expansion in the finish coat from unhydrated magnesium oxides. Does not require soaking. Both comply with ASTM C206, Type S.

RED TOP and GRAND PRIZE Normal Hydrate Finish Limes. Single-hydrate lime requires overnight soaking before blending with gauging plaster. Both comply with ASTM C206, Type N.

Finish Coat Plaster General Limitations

- 1 A smooth trowel finish should not be used over lightweight aggregate gypsum basecoat applied over metal lath. Only sand float finishes are recommended over metal lath.
- 2 Where the gypsum basecoat is STRUCTO-LITE Plaster or contains lightweight aggregate (perlite or vermiculite) and a smooth trowel finish is used over any plaster base except metal lath, the finish coat should be RED TOP Gauging Plaster and lime:
 - a) with addition of 1/2 cu. ft. of perlite fines, or,
 - b) with addition of 50 lb. of No. 1 white silica sand per 100 lb. gauging plaster, or,
 - c) use a Quality (RED TOP, CHAMPION, or STAR), factory-aggregated gauging plaster.
- 3 Gypsum or lime-based finishes, including Keenes cement, should not be used directly over a portland cement basecoat or over concrete block or other masonry surfaces.
- 4 Smooth trowel high strength finishes such as STRUCTO-GAUGE Gauging Plaster and Keenes Cement, must not be used over STRUCTO-LITE Plaster or a basecoat with a lightweight aggregate.
- 5 Gauged-lime putty and RED TOP Finish applied over conventional basecoat plasters must age 30 days, be thoroughly dry and properly sealed before decorating. Quick-drying vinyl acrylic latex or alkali-resistant alkyd primer-sealers are recommended.
- 6 Primers containing polyvinyl acetate (PVA) are not recommended and should not be specified for use with any plaster finish with the exception of IMPERIAL Plaster Finish. When lime-containing plasters are combined with moisture, PVA primers can cause bond loss with resultant paint delamination and job failure. In view of these precautions, strictly follow the specific lime-locking product recommendations of paint manufacturers for painting lime-gauging putty finishes and for lime-containing veneer plaster finishes.

Portland Cement-Lime Plaster is for interior applications with high-moisture conditions, or for exterior stucco. It is available for job-mixing with a pre-mixed prepared finish as follows:

Job-mixed Stucco—mix BONDCRETE or MORTASEAL Mason's Lime with portland cement and sand according to ASTM C926,

suggested in portland cement:lime:sand ratios (bags:bags:ft³) as follows:

Basecoat

- Scratch coat—1:1:8
- Brown coat—1:1:10

Finish

Apply mill-mixed ORIENTAL Exterior Stucco Finish with a sand float or texture finish in accordance with U.S. Gypsum data sheet P-541.

Alternate job-mixed finish coat ratio: 1:1½:9.

Limitations: (1) all coats require water curing after set; (2) control joints every 10 linear feet or 100 sq. ft. of area are needed to compensate for shrinkage during drying; (3) first secure self-furring metal lath to smooth, dense surfaces and apply only to the lath, never directly; (4) never use as a base coat beneath a Keenes cement-lime putty finish coat.

Special Plasters

USG Moulding Plaster is finely ground to permit excellent detail reproduction in specialized work such as cast ornamental enrichments or running cornices. Controlled set for accurate reproduction. Complies with ASTM C28, available white or grey.

White HYDROCAL Gypsum Cement provides exceptional strength for producing ornament with durable fine detail. Recommended for thin castings and those made from intricate latex molds.

HYDROCAL FGR Gypsum Cement glass reinforcing fibers can be used with this product for a unique high strength material. It costs less than filled polyesters, but handles deep patterns and accepts most coatings. Ideal for fabricating lightweight, fire-resistant decorative shapes, restorations, cornices and trims.

Veneer Plaster Bases

IMPERIAL Gypsum Base is a solid gypsum lath in large, drywall-size sheets, with blue face paper designed for veneer plaster systems.

Attachment is fast with nails or SUPER-TITE Screws, to wood or steel studs, furring channels or suspended metal grillage. Edges are treated with IMPERIAL Glass Fiber Tape, Type P or Type S and the appropriate veneer plaster basecoat or finish plaster; or with SHEETROCK Joint Tape and SHEETROCK Setting-Type Joint Compound (DURABOND). Corners are finished with SHEETROCK No. 800 or 900 Corner Beads. Complies with ASTM C588.

Sizes: 4'x8', 4'x10', 4'x12', 4'x14', in ½" or ⅝" thicknesses.

Foil-Back IMPERIAL Gypsum Base is identical to Regular IMPERIAL Base, except with the back side laminated to aluminum foil to function as a vapor retarder (tests according to ASTM E96 desiccant method) with only 0.06 perm vapor permeance. Retains all the fast attachment and functional advantages of Regular IMPERIAL Gypsum Base. Complies with ASTM C588.

Sizes: 4'x8', 4'x10', 4'x12', 4'x14', in ½" or ⅝" thicknesses.

IMPERIAL FIRECODE, and FIRECODE C, Gypsum Bases for fire-rated veneer plaster assemblies have a core especially formulated with special minerals for maximum fire resistance and listed by UL under Label Service. Both retain all the fast attachment and functional advantages of Regular IMPERIAL Gypsum Base. Complies with ASTM C588.

Sizes: 4'x8', 4'x10', 4'x12', 4'x14', in ½" or ⅝" thicknesses.

Gypsum Plaster Laths

ROCKLATH Plaster Base is a solid gypsum board lath for conventional plaster, with special paper facing for maximum plaster bond. Requires about 45% less basecoat plaster than with metal lath. With convenient 16" or 24" widths and efficient 4' or 8' lengths, it is designed for fast attachment to framing, either wood studs (with nails or staples) or steel studs, furring channels or suspended metal grillage (with SUPER-TITE Screws and BRIDJOINT B-1 Clips). Complies with ASTM C37.

Sizes: (¾" thick) 16"x48", 16"x96"; (½" thick) 16"x96", 24"x96".

Comparing Conventional Plaster, Veneer Plaster and Drywall Systems

System	Characteristics	Comments			
1. Conventional Plaster	Best system to attain a uniform, monolithic, blemish-free, smooth surface with excellent wear resistance. Cast to intricate forms. High cost.				
2. Commercial Application: IMPERIAL Basecoat with all finish plasters (two-coat). Residential Application: DIAMOND Veneer Basecoat Plaster with finish "B" and "C" (two-coat).		FINISH PLASTER RATING (No. 1 Best-No. 4 Acceptable)			
		Productivity	Hardness	Workability	Ease to achieve smooth surface
A. IMPERIAL Finish	Ultimate in surface hardness and abrasion resistance. Easily textured. Low productivity and hard to achieve a completely smooth finish.	4	1	4	4
B. DIAMOND Interior Finish	Single bag, ready-to-use finish. Moderate high strength. Acceptable workability. Extremely adaptable to textured finishes. Satisfactory smooth finish.	2	2	2	3
C. Regular Gauging Lime Putty or RED TOP Finish	Highest productivity. Best workability. Joinable, easiest to achieve a monolithic finish. Only moderate surface hardness.	1	4	1	1
D. STRUCTO-GAUGE Gauging Lime putty (1:1)	Hardest dense putty finish. Moderate workability and ease of application. Excellent finish appearance.	2	3	2	2
E. RED TOP Keenes Cement Lime Putty and Sand	Unique, only truly retemperable material. Best choice for coloring or tinting large plaster wall areas. Ultimate choice for texturing. Can be floated for extended time period.	Due to unique nature Keenes is not rated with above finishes.			
3. IMPERIAL Finish Plaster (one-coat)	Monolithic, smooth or textured appearance. Ultimate in surface hardness. Primarily intended for direct application to plaster base. Achieves high productivity due to compatibility with absorbent surface plaster base. Ready for finishing in 48 hours with favorable drying conditions.	Fast completion shortens construction time, brings in paying tenants faster, thus reducing interest paid on project construction loan.			
4. DIAMOND Interior Finish Plaster (one-coat)	Monolithic appearance. Hard wear-resistant surface. Provides texture desired. Ready for final finish in as little as 48 hours under favorable drying conditions. Greatest coverage for single coat application over special absorbent surface of plaster base. Lowest cost veneer system.	See comment IMPERIAL Finish.			
5. Gypsum Drywall	Relatively smooth surface with acceptable monolithic appearing surface under most conditions. Lowest cost. Resistant to abrasion. Most susceptible to nail pops and joint photographing.				

ROCKLATH and Veneer Plaster Base General Limitations

- 1 Maximum frame and fastener spacing is dependent on thickness and type of lath used. Refer to SA-919 Gypsum Products, Accessories & Systems in Sweet's General Building & Renovation file, section 09250, or SA-923 Drywall/Steel Framed Systems.
- 2 Should be used with gypsum plasters only. Lime-putty finishes or portland cement plaster and ROCKLATH Base are incompatible and not recommended.
- 3 IMPERIAL Gypsum Base with 1-coat IMPERIAL Finish has a vapor permeance of 5.3 perms. For higher resistance to vapor transmission, Foil-Back IMPERIAL Gypsum Base should be used.
- 4 Should not be used in areas with sustained high relative humidity or where exposed to excessive moisture for extended periods. Galvanized metal lath and portland cement-lime plaster or the appropriate DUROCK Cement Board System is recommended.
- 5 Maximum frame spacing for $\frac{3}{8}$ " ROCKLATH Plaster Base should not exceed 16" o.c.

UNIMAST Metal Lath

Steel Products such as metal lath and steel accessories identified as UNIMAST products in this catalog are exclusively marketed by United States Gypsum Company as integral components of our plaster systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

UNIMAST Junior Diamond Mesh Lath is a general all-purpose lath, best for ornamental and contour plastering, available painted or galvanized. Small-diamond mesh size (approx. 11,000 meshes per sq. yd.) reduces plaster droppings. A self-furring type, for exterior stucco, column fireproofing and replastering old surfaces, is "dimpled" at $1\frac{1}{2}$ " o.c. each way with $\frac{1}{4}$ " indentations.

Sizes: 27"x96"

Weights: 1.75 lb/yd² (end not painted)
2.5 lb/yd² (end painted white),
3.4 lb/yd² (end painted red).

Types: (painted) (galvanized) (regular) (self-furring)

UNIMAST Asphalt Paper-Backed Metal Lath is identical, including size/weight availability, to Junior Diamond Mesh Lath, except additionally factory bonded on the back with asphalt-impregnated paper. Available to conform to Federal Spec. UU-B-790a; type I, grade D, style 2 and type 1, grade B, style 1a (Western Region).

Sizes: 27"x96"

Weights: 1.75 lb/yd²
2.5 lb/yd²
3.4 lb/yd²

Types: (painted) (galvanized) (regular) (self furring)

UNIMAST 4-Mesh Z-Riblath is a "flat rib" lath with smaller mesh openings, suitable for "double-up" plastering. Its rigidity makes it an excellent lath for nail-on, or tie-on work on flat ceilings.

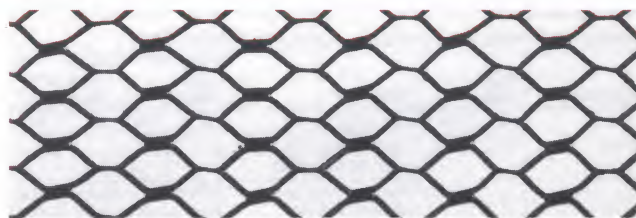
Sizes: 27"x96"

Weights: 2.75 lb/yd² (end painted white),
3.4 lb/yd² (end painted red).

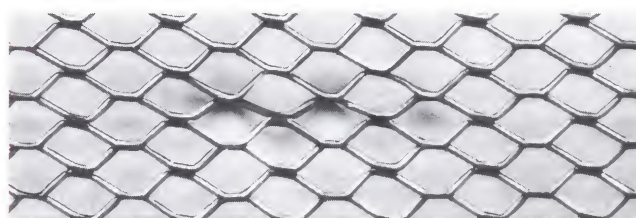
Types: (painted) (galvanized)

Limitations: not for contour plastering; Diamond Mesh type is preferred.

UNIMAST $\frac{3}{8}$ " Riblath is a very rigid lath for: framing spaced up to 24" o.c., for studless, 2" solid plaster partitions, or as a centering for concrete floor or roof slabs. Its superior rigidity comes from $\frac{3}{8}$ " main V-ribs at $4\frac{1}{2}$ " intervals, plus inverted $\frac{3}{16}$ " intermediate ribs,



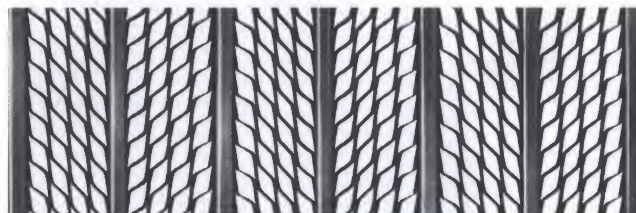
UNIMAST Junior Diamond Mesh Lath



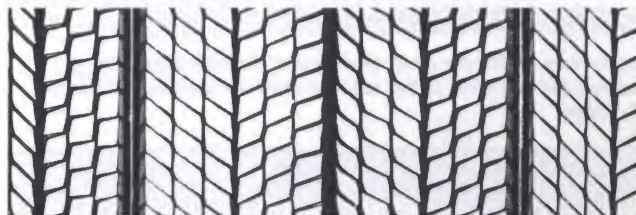
UNIMAST Self-Furring Diamond Mesh Lath



UNIMAST Paper-Backed Metal Lath



UNIMAST 4-Mesh Z-Riblath



UNIMAST $\frac{3}{8}$ " Riblath

reinforcing a strong, herringbone pattern mesh. Available painted or galvanized.

Sizes: 27"x96" (other lengths also available).

Weights: 3.4 lb/yd² (end painted red).

Types: (painted) (galvanized)

Limitations: too rigid for contour plastering; use Diamond Mesh type. Due to $\frac{3}{8}$ " rib, min. ground thickness must be 1".

Metal Lath General Limitations

- 1 Metal lath products should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives.
- 2 In ceiling assemblies, certain precautions concerning construction, insulation and ventilation are necessary for good performance. A min. of $\frac{1}{2}$ sq. in. net free vent area is recommended per sq. ft. of horizontal surface in plenum or other space.

Technical Data

Frame and Fastener Spacing—ROCKLATH Plaster Base

Type framing	Base thickness		Fastener ⁽¹⁾	Max. frame spacing		Max. fastener spacing	
	in	mm		in	mm	in	mm
Wood	3/8	9.5	Nails—13 ga. 1 1/8" long, 1 5/16" flat head, blued.	16	406	5	127
	1/2	12.7	Staples—16 ga. galv. flattened wire, flat crown 7/16" wide, 1" divergent legs				
UNIMAST Steel Stud	3/8	9.5	Nails—13 ga. 1 1/4" long, 1 5/16" flat head blued	24	610	4	102
	1/2	12.7	Staples—16 ga. galv. flattened wire, flat crown 7/16" wide, 1" divergent legs				
UNIMAST Metal Furring-DWC-20 DWC-25	3/8	9.5	1" drywall screws	16	406	12	305
	1/2	12.7		24	610	6	152

(1) Metric; fastener dimensions: 1 5/16" = 7.5mm: 3/8" = 11.1mm: 1" = 25.4mm: 1 1/8" = 28.6mm: 1 1/4" = 31.8mm.



ROCKLATH Base attaches easily to steel stud. ROCKLATH edge joints at corners and end joints falling between studs are secured with BRIDJOINT B-1 Clips.



ROCKLATH Plaster Base provides a superior surface for basecoat plaster.

Max. Frame Spacing—UNIMAST Metal Lath⁽¹⁾

Product	Weight		Spacing	
	lbs./sq. ft.	kg/m ²	in	mm
Diamond Mesh ⁽²⁾	2.5	1.4	12 ⁽³⁾	305 ⁽³⁾
	3.4	1.8	16	406
3/8" (9.5mm) Riblath	3.4	1.8	24	610
4-Mesh Z-Riblath	2.75	1.5	16 ⁽⁴⁾	406 ⁽⁴⁾
	3.4	1.8	19 ⁽⁵⁾	483

(1) For spacing on fire-rated constructions, see test reports.

(2) 2.5-lb. lath should not be used for ceilings. (3) 16" o.c. permitted with wood framing and 2" solid partition. (4) Spacing of metal ceiling grille 12" o.c. (5) 24" spacing with solid partition.

Max. Spacing—Main Runner—Carrying Channels

Main runner c. r. channel size		Max. c. to c. spacing of main runners		Max. spacing of hangers along runners	
in	mm	ft	mm	ft	mm
3/4	19.1	3	914	2	610
3/4	19.1	2 1/4	686	3 ⁽¹⁾	914
1 1/2	38.1	4	1219	3	914
1 1/2	38.1	3 1/2	1067	3 1/2	1067
1 1/2	38.1	3	914	4	1219
2	50.8	4	1219	5	1524
2	50.8	2 1/2	762	6	1829
2	50.8	2	610	7	2134

(1) For concrete joist construction only—where 8-ga. wire may be inserted in joist before concrete is poured.

Max. Spacing—Cross-Furring Members

Cross-furring size	Max. c. to c. spacing of cross-furring		Main runner or support spacing	
	in	mm	ft	mm
3/4" (19.1mm) C.R. Channel	24	610	3	914
3/4" (19.1mm) C.R. Channel	19	483	3 1/2	1067
3/4" (19.1mm) C.R. Channel	16	504	4	1219
1" (25.4mm) H.R. Channel	24	610	4	1219
1" (25.4mm) H.R. Channel	19	483	4 1/2	1372
1" (25.4mm) H.R. Channel	12	305	5	1524
3/8" (9.5mm) Pencil Rod ⁽¹⁾	19	483	2	610
3/8" (9.5mm) Pencil Rod ⁽¹⁾	12	305	2 1/2	762

(1) Primary usage is on furred ceiling members.

Support Area—Hangers

Hanger size and type	Max. ceiling area per hanger		Allowable tensile load
	ft ²	m ²	
9-ga. galvanized wire	12.5	1.2	340
8-ga. galvanized wire	16	1.5	408
3/16" (4.8mm) mild steel rod ⁽¹⁾	20	1.9	546
1/4" (6.4mm) mild steel rod ⁽¹⁾	22.5	2.1	972
3/16" x 1" (4.8mm x 25.4mm) mild steel flat ⁽¹⁾	25	2.3	3712

(1) Where severe moisture conditions may occur rods galvanized or painted with rust-inhibitive paint, or galvanized straps are recommended. (2) Based on minimum yield 33,000 psi.

Section Properties—UNIMAST Studs and Channels

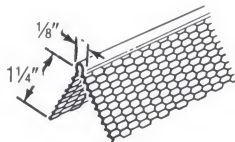
Item	Gauge	Width	Depth	Steel thick. in. *	I _x in ⁴	S _x in ³	F _c ksi
Steel Stud							
158ST25	25	1 5/8"	—	0.0188	0.038	0.040	19.8
212ST25	25	2 1/2"	—	0.0188	0.101	0.071	19.8
358ST25	25	3 5/8"	—	0.0188	0.239	0.113	19.8
400ST25	25	4"	—	0.0188	0.302	0.123	19.8
600ST25	25	6"	—	0.0188	0.773	0.184	19.8
Metal Furring Channel							
DWC-25 (hemmed)	25	—	7/8"	.0188	.0096	.0247	13.9
DWC-20 (unhemmed)	20	—	7/8"	.0344	.0165	.0355	18.8
Cold-Rolled Channel							
3/4"	16	—	3/4"	0.0566	0.007	0.019	19.8
1 1/2"	16	—	1 1/2"	0.0566	0.039	0.052	19.8
2"	16	—	2"	0.0566	0.083	0.083	19.8

* Base steel design thickness

Veneer Plaster Trim Accessories*

SHEETROCK Corner Bead, No. 800

For one-coat veneer plaster and for superior bonding and crack-resistant drywall corners. Easily nailed or stapled in place. Provides $\frac{1}{16}$ " grounds with $1\frac{1}{4}$ " fine-meshed expanded flanges.

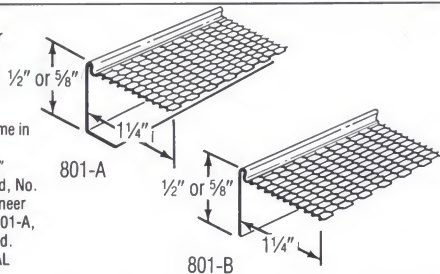


SHEETROCK Corner Bead, No. 900

For two-coat veneer plaster finishes. Easily nailed or stapled in place and providing the required $\frac{3}{32}$ " grounds. Flanges of $1\frac{1}{4}$ " fine mesh provide superior plaster key and eliminate shadowing.

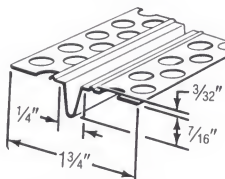
SHEETROCK Metal Trims

Protect edges of veneer plaster finish at cased openings and intersections of ceilings/walls. Fine-mesh expanded flanges strengthen plaster bond and eliminate shadowing. They come in two styles and two grounds. Two-coat veneer systems ($\frac{3}{32}$ " grounds): No. 701-A, J-shaped, No. 701-B, L-shaped. One-coat veneer systems ($\frac{1}{16}$ " grounds): No. 801-A, J-shaped, No. 801-B, L-shaped. Sizes: for $\frac{1}{2}$ " and $\frac{5}{8}$ " IMPERIAL Gypsum Bases.



SHEETROCK Zinc Control Joint, No. 093

Relieves veneer plaster expansion/contraction stresses in large areas. Used from floor to ceiling in long partition runs, and from header to ceiling above door frames. Plastic tape, removed after plastering, protects a $\frac{1}{4} \times \frac{1}{16}$ " deep slot. Roll-formed from zinc, it is corrosion resistant. Grounds: $\frac{3}{32}$ ". Length: 10'.



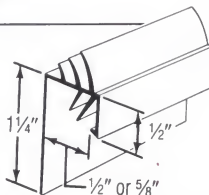
IMPERIAL Tape

A special glass fiber open-weave tape designed to reinforce joints of IMPERIAL Gypsum Bases prior to veneer finishing. Open weave of tape allows rapid air escape during embedding; highly crack-resistant. Two types: P, pressure-sensitive, and S, staple-attached.



USG P-1 Vinyl Trim

A rigid channel trims and acoustically seals perimeters of veneer finish partitions. Flexible vinyl fins compress upon installation to provide performance comparable to one bead of acoustical sealant. Sizes: for $\frac{1}{2}$ " and $\frac{5}{8}$ " thick gypsum bases. Lengths: 8', 9', 10'.

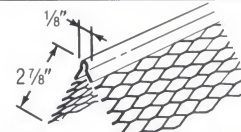


*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Conventional Plaster Lath Accessories*

UNIMAST 1-A Expanded Corner Bead

Easily flexed for irregular corners. Reinforces close to nose of bead, made with $2\frac{7}{8}$ " wide expanded flanges, in galvanized steel, or zinc alloy for exterior use.



UNIMAST Double-X Corner Bead

Ideal for structural tile and rough masonry, adjusts easily for plaster depth on columns. Perforated stiffening ribs along expanded flange.



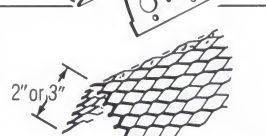
UNIMAST 4-A Flexible Corner Bead

Ideal for curved edges (archways, telephone niches, etc.). Versatile and economical as an "all purpose" corner bead. Snipping flanges lets you bend this bead to any curvature radius.



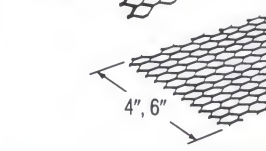
UNIMAST Cornerite

Strips of Diamond Mesh Lath for reinforcement. Available as painted or galvanized steel: Cornerite, bent in the center to a 100° angle, reinforces interior angles between unlapped metal lath, and between masonry constructions (to reduce plaster cracking), and nonferrous lath. Sizes: 2"x2"x96", 3"x3"x96".



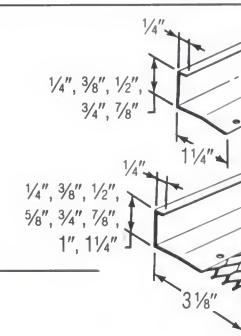
UNIMAST Striplath, a flat strip,

reinforces joints of nonmetallic and/or dissimilar plaster lathing/bases; also spans pipe chases. Sizes: 4"x96", 6"x96".



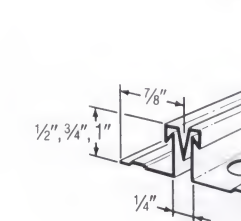
UNIMAST Casing Beads

Use $\frac{3}{4}$ " casing beads with metal lath, $\frac{5}{8}$ " beads with all masonry units. When flange is applied under ROCKLATH Plaster Base, use $\frac{7}{8}$ " beads; over ROCKLATH Base, $\frac{1}{2}$ " beads. Made from corrosion-resistant galvanized steel or zinc alloy for exterior applications. #66 Square Edge Sizes with $1\frac{1}{4}$ " short, solid flange: $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ". #66 Square Edge Sizes with $3\frac{1}{8}$ " long, expanded flange: $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ", 1", $1\frac{1}{4}$ ". Length: 10'.



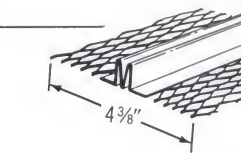
SHEETROCK Zinc Control Joints Nos. 50, 75, 100

Relieves plaster expansion/contraction stresses in large areas. Used from floor to ceiling in long partition runs, and from header to ceiling above door frames. Plastic tape, removed after plastering, protects a $\frac{1}{4} \times \frac{1}{2}$ " deep slot. Roll-formed from zinc, it is corrosion-resistant for both interior and exterior use with gypsum or portland cement plaster. Sizes, grounds: No. 50, $\frac{1}{2}$ "; No. 75, $\frac{3}{4}$ "; No. 100, 1" (for exterior stucco curtain walls). Length: 10'. Limitations: adequate protection must be provided behind the control joint to maintain sound and/or fire ratings. Zinc control joint should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives.



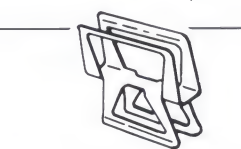
UNIMAST Double V Expansion Joint

Provides stress relief to control cracking in large plastered areas. Made with expanded flanges of corrosion-resistant galvanized steel, or zinc for exterior use. Grounds: $\frac{1}{2}$ ", $\frac{3}{4}$ ". Lengths: 10'.



BRIDJOINT Field Clip B-1

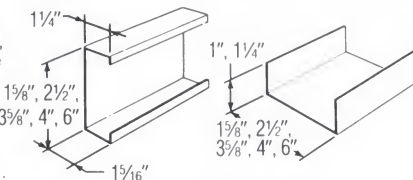
Supports and aligns $\frac{3}{8}$ " thick ROCKLATH base ends where joints do not fall directly over 16" o.c. max. framing members; designed for use with $\frac{3}{8}$ " ROCKLATH Plaster Base.



Framing and Furring Accessories*

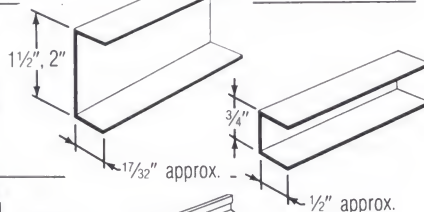
UNIMAST Steel ST-Studs and CR-Runners

Channel-shaped, roll-formed, with corrosion-resistant coating. Secure, rigid screw or clip attachment of the gypsum base utilizes the full structural contribution of the lath and plaster membrane. Stud widths: 1½" (for ST25 only), 2½", 3½", 4", 6"; stud styles: ST25, ST22, ST20. Stud lengths: 8' to 16'. Runners come in stud widths, 10' length only.



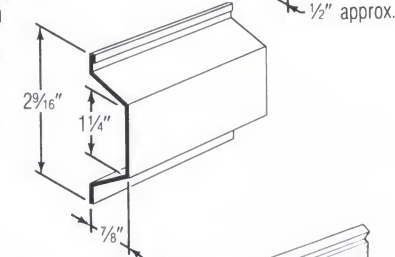
UNIMAST Cold-Rolled Channels

Made of 16-ga. steel. Used for furring, suspended ceilings, partitions, ornamental lathing. Available either galvanized or black asphaltum painted. Sizes: ¾", with ½" flange; 1½" and 2" with 1½" flange. Lengths: 16' and 20'.



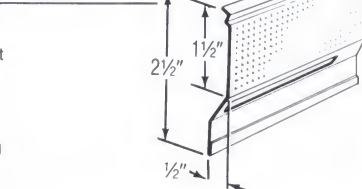
UNIMAST Metal Furring Channels

Hat-shaped channels for ceiling and wall furring. Roll-formed from two gauges of corrosion-resistant steel. DWC-25 for screw attachment of ROCKLATH and IMPERIAL Bases. DWC-20 for greater spans, load-carrying capacity and exterior furring. Products comply with ASTM C645. Face width: 1¼", depth: 7/8"; length: 12'.



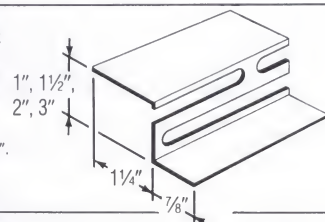
RC-1™ Resilient Channel

Part of the family of SHEETROCK Metal Products. Corrosion-resistant steel channel for resilient attachment of IMPERIAL Gypsum Bases to wood and steel framing. Prepunched holes in the flange facilitate screw fastening to framing members with 1¼" Type W or S screws. Not suitable for use with more than 2 layers of 5/8" thick gypsum panels.



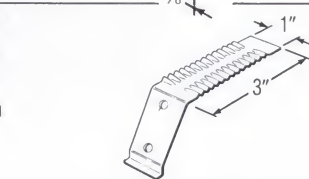
SHEETROCK Z-Furring Channels

Mechanically attach THERMAFIBER insulation and rigid foam insulations and IMPERIAL Gypsum Base to interior of masonry walls. Made of corrosion-resistant, hot-dip galvanized steel. Furring depths: 1", 1½", 2", 3"; length: 8' 6".



UNIMAST Adjustable Wall Furring Brackets

Used in braced furring systems for interior or exterior masonry walls. Made of 20-ga. galvanized steel, and attached to steel studs. Furring depth: up to 2¼" plus stud width.



UNIMAST Metal Furring Channel Clip

Galvanized 1½" wire used to attach metal furring channels to 1½" cold rolled channel ceiling grillwork.



UNIMAST Tie Wire and Hanger Wire

Tie wire is 18-ga. galvanized steel wire used in drywall/plaster to tie furring channel to runners and in plaster to tie metal lath to channel. Hanger wire is 8-ga. galvanized steel for hanging 1½" runner channels in drywall/plaster suspended ceilings.



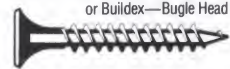
Screws from Unimast Incorporated

Fastening Applications

Fastener Used

Single and double-layer IMPERIAL Base, ROCKLATH Base to steel studs, metal furring; (1" screw only) IMPERIAL Gypsum Bases to resilient channel.

1", 1½", 1¾" and 1⅝" SUPER-TITE or Buildex—Bugle Head



Core units and face-layer IMPERIAL Base to steel runners in caged beam fireproofing.

1¼", 1⅝", 2¼" and 2⅝" Type S—Bugle Head



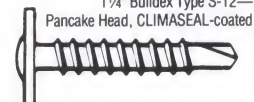
Gypsum sheathing and IMPERIAL Base to steel studs in curtain wall assemblies.

1", 1¼", 1⅝", 1⅞", 2⅝", 2⅞" and 3" Buildex Type S-12 or SUPER-TITE DRILLERS—Bugle Head



Metal lath and brick ties over gypsum sheathing to steel framing in curtain wall assemblies.

1¼" SUPER-TITE modified trusshead, zinc-coated, or 1¼" Buildex Type S-12—Pancake Head, CLIMASEAL-coated



Wood trim over single and double-layer IMPERIAL Base to steel studs and runners.

1⅝" and 2" SUPER-TITE (Phillips and square) or 1", 1⅝" Buildex Type S and S-12, and 2¼" Type S—Trim Head



Steel studs to steel runners.

7/16" SUPER-TITE Pan Framing or 3/8" Buildex Type S—Pan Head



Steel studs to runners, metal door frame.

1/2", 5/8" SUPER-TITE DRILLERS or 3/8", 1/2" Buildex Type S-12—Pan Head



Steel-to-steel attachment up to 12-ga. total in curtain walls and steel framing.

1/2" Buildex Type S-12—Low-profile Head



Cabinets to steel studs and resilient channel.

1¼", 1⅝", 2¼", 2⅝", 3" Buildex Type S—Oval Head



Single-layer IMPERIAL Gypsum Base to wood framing; resilient channels to wood framing.

1¼" SUPER-TITE or Buildex Type W—Bugle Head



Face-layer IMPERIAL Base to base-layer IMPERIAL Base in laminated partitions.

1½" Buildex Type G or SUPER-TITE laminating—Bugle Head



*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Wood Framed Veneer Plaster Systems

In these systems, a veneer application ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated gypsum finish is applied in one coat over IMPERIAL Gypsum Base attached to wood framing. DIAMOND Interior Finish, offering superior coverage and workability, provides economical surfaces with outstanding beauty and durability. Regional veneer plasters such as Norfolk Special Veneer and USG Florida Finish Veneer are available which also offer white finished wall and ceiling surfaces that provide excellent durability and wear. Higher-strength IMPERIAL Finish provides abrasion and crack-resistant walls and ceilings of exceptional hardness. IMPERIAL Basecoat or DIAMOND Veneer Basecoat Plaster are used as basecoats in two-coat systems.

Partitions—IMPERIAL Gypsum Base is directly attached to wood studs with Type W SUPER-TITE Screws or nails. Where a 2-hour fire rating is required, double-layer FIRECODE C Base is used. For superior sound control, IMPERIAL Gypsum Base is attached to one side of wood studs using the RC-1™ Resilient Channel. Base is fastened to channels with Type S SUPER-TITE Screws. This system, with THERMAFIBER SAFB inserted in the stud cavity, provides one of the most economical party walls.

Ceilings—High-quality, fire-resistant ceilings are rapidly installed with IMPERIAL Gypsum Base applied directly to wood joists or over resilient channels for added sound control. Double-layer IMPERIAL FIRECODE C Gypsum Base separated by resilient channels, offers systems with 2-hour fire ratings.

Features

Durability—Abrasion- and crack-resistant features of IMPERIAL Finish offer the durability needed in high-traffic areas.

Fire Resistance—2 hours with double-layer $\frac{5}{8}$ " FIRECODE Base; 1-hour rating using single-layer FIRECODE C Base.

Sound Control—The systems offer sound isolation up to 53 STC with the use of resilient channels and SAFB.

Fast Completion—Easily applied, fast drying—possibly ready for next-day decorating or painting. The white surface obtainable with DIAMOND Interior Finish, when sand-floated or textured, may be acceptable without further decoration (see Decorating, page 29).

Economy—Simple, inexpensive components which erect quickly plus speedy finish application make these systems competitive to drywall assemblies in many instances.

Limitations

- 1 These constructions should not be used where normally exposed to excessive moisture, humidity or temperature.
- 2 Type S screws must be used for attachment of single-layer base to resilient channels.
- 3 RC-1 Resilient Channels must be attached to wood framing only with $\frac{1}{4}$ " Type W screws. Nails should not be used.
- 4 Resilient ceilings should not be installed beneath highly flexible floor joists.

Technical Data

Maximum frame spacing⁽¹⁾

Base and finish assembly	Wood framing spacing	
	in	mm
$\frac{1}{2}$ " IMPERIAL Gypsum Base one layer, 1-coat system one layer, 2-coat system two layers, 1 & 2 coat system	16 16 or 24 ⁽²⁾ 24	406 406 or 610 ⁽²⁾ 610
$\frac{5}{8}$ " IMPERIAL Gypsum Base one layer, 1-coat system one layer, 2-coat system two layers, 1 & 2 coat system	16 or 24 ⁽²⁾ 24 ⁽²⁾ 24	406 or 610 ⁽²⁾ 610 ⁽²⁾ 610

(1) For perpendicular or parallel application—Perpendicular preferred for maximum strength; parallel application not recommended for ceilings. For fire-rated construction, see test report. (2) 24" spacing requires joint treatment with SHEETROCK Setting-Type Compound and SHEETROCK Joint Tape.

Maximum fastener spacing⁽¹⁾

Assembly description	Type of fastener	Location	Max. spacing	
			in	mm
single layer, wood frame & face layer of double layer assembly	Ann. Ring Nails ⁽²⁾	Ceilings & Walls	7	178
	$\frac{1}{4}$ " Type W Screws	Ceilings & Walls	12	305
single layer, resilient channel	1" Type S Screws	Ceilings & Walls	12	305
base layer of double layer construction	Ann. Ring Nails ⁽²⁾ or $\frac{1}{4}$ " Type W Screws	Ceilings & Walls	24	610

(1) For non-fire rated assemblies; select fasteners for fire-rated construction from test report or from table in SA-923. (2) For annular ring nails, select length to provide $\frac{3}{4}$ " penetration into wood framing.

Fixture attachment load data

Fastener	Size		Allowable withdrawal resistance		Allowable shear resistance	
	in	mm	lb	N ⁽¹⁾	lb	N ⁽¹⁾
toggle bolt or hollow wall anchor	$\frac{1}{8}$	3.18	20	89	40	178
	$\frac{3}{32}$	4.76	30	133	50	222
	$\frac{1}{4}$	6.35	40	178	60	267
No. 8 sheet metal screw into 25-ga. metal sheet			50	222	100	445

(1) Newtons

Steel Framed Veneer Plaster Systems

In these systems a veneer application ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated, gypsum plaster is applied over IMPERIAL Gypsum Base. Either IMPERIAL Finish or DIAMOND Interior Finish is applied in a single-coat system. IMPERIAL Basecoat or DIAMOND Veneer Basecoat Plaster is used in a two-coat application as a superior base for IMPERIAL Finish, DIAMOND Interior Finish, RED TOP Finish, gauged lime putty, STRUCTO-GAUGE Gauging Plaster and lime (smooth trowel), or Keenes-lime-sand-float finish. Also suitable for application of other special veneer finishes such as Norfolk Special Veneer Plaster or USG Florida Finish Veneer Plaster, which are available on a regional basis only. Refer to SA-923 Drywall/Steel Framed Systems concerning technical data for typical steel framing components.

Partitions

Single Layer—steel studs set in steel runners with 1-layer, $\frac{1}{2}$ " thick IMPERIAL FIRECODE C Base, screw-attached to $2\frac{1}{2}$ " studs 16" o.c. This assembly has a 1-hour fire rating, is suited for interior partitions and corridor walls. Exclusive "creased" THERMAFIBER SAFB systems offer 50 to 55 STC ratings and 1-hour fire ratings at the lower in-place costs of single-layer assemblies.

Double-Layer—With double-layer $\frac{1}{2}$ " IMPERIAL FIRECODE C Base, attached by means of Type S Screws to $2\frac{1}{2}$ " or $3\frac{5}{8}$ " studs spaced 24" o.c., a 2-hour fire rating plus sound control suitable for party walls is available.

Multi-Layer—Multi-layer 1/2" IMPERIAL FIRECODE C Gypsum Base and veneer plaster assemblies offer 3 and 4-hour fire ratings and 62 STC sound control. Where added partition width is required, double rows of steel studs are erected to provide chase walls with up to 20 3/4" net pipe chase width. Up to 4-hour column fire protection is also available.

Features

Durability—The high-strength, abrasion- and crack-resistance of IMPERIAL Plaster offers durability needed for high-traffic areas.

Fire Resistance—Noncombustible components provide systems with fire-resistance ratings up to 4 hours.

Sound Control—The systems offer sound isolation up to 62 STC; ideal for party walls.

Versatility—Adaptable to most dimensions or modules in virtually all buildings, these systems meet normal design and job conditions.

Light Weight—The completed partition systems weigh appreciably less than masonry assemblies of the same thickness.

Economy—Simple, inexpensive components erect quickly at a lower cost than conventional plaster systems.

Limitations

- 1 Non-load bearing.
- 2 These assemblies should not be used where exposed to abnormal moisture or excessive humidity or temperature.
- 3 Maximum frame spacing, and steel stud/runner structural properties limiting heights should not be exceeded (see tables in SA-923).
- 4 Select limiting heights and deflections for steel framed veneer plaster systems as follows:
 - (a) L/240 for veneer plaster systems;
 - (b) L/360 for conventional plaster systems and other brittle surface materials;
 - (c) L/360 is preferred by many designers to upgrade the integrity of veneer plaster systems used in conjunction with "working" shafts and also to maintain optimal veneer performance. United States Gypsum Company supports this widespread practice.
- 5 Consult stud manufacturer's tables and structural properties to determine final stud selection.
- 6 SHEETROCK Joint Tape and SHEETROCK Setting-Type Joint Compound (DURABOND) must be used as the method of joint reinforcement with all steel framed veneer plaster systems and be allowed to set before plaster application.

Technical Data

Maximum frame spacing⁽¹⁾

Base and finish assembly	Steel framing spacing	
	in	mm
1/2" IMPERIAL Gypsum Base one layer, 1-coat system	16	406
one layer, 2-coat system	24	610
two layers, 1 & 2 coat system	24	610
5/8" IMPERIAL Gypsum Base one layer, 1-coat system	24	610
one layer, 2-coat system	24	610
two layers, 1 & 2 coat system	24	610

(1) For perpendicular or parallel application—perpendicular preferred for maximum strength; parallel application not recommended for ceilings. For fire-rated construction, see test report.

Fixture attachment load table

Fastener	Size		Base assembly	Allowable withdrawal resistance		Allowable shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
toggle bolt or hollow wall fastener	1/8	3.18	1/2" gypsum base	20	89	40	178
	3/16	4.76		30	133	50	222
	1/4	6.35		40	178	60	267
	1/8	3.18	1/2" gypsum base & 25-ga. steel stud	70	311	100	445
	3/16	4.76		80	356	125	556
	1/4	6.35		155	689	175	778
No. 8 sheet metal screw			1/2" gypsum base & 25-ga. steel stud or 25-ga. steel insert	50	222	80	356
Type S bugle head screw				60	267	100	445
Type S-12 bugle head screw			1/2" gypsum base & ST20 steel stud or 20-ga. steel insert	85	378	135	600
3/8" Type S pan head screw			25-ga. steel to 25-ga. steel	70	311	120	534
two bolts welded to steel insert	3/16	4.76	grab bar attachment	175	778	200	890
	1/4	6.35		200	890	250	1112
bolt welded to 1 1/2" chan.	1/4	6.35	plumber's bracket	200	890	250	1112

(1) Newtons

RC-1™ Resilient Channel/Steel Framed Partitions

Resilient application of gypsum base and veneer plaster using RC-1 Resilient Channels over steel framing offers increased privacy with a sound controlled environment. Low cost assemblies with high sound ratings are available to meet the design requirements for many corridor and party wall applications. The highly effective sound attenuation is possible due to the decoupling action of the resilient channel combined with the "creased" THERMAFIBER SAFB in the framing cavity.

In these thin, lightweight assemblies, horizontal resilient channels, 24" o.c., are screw-attached to one side of 3/8" steel studs spaced 24" o.c. and set in runners. Gypsum base is screw-attached to these resilient channels on one side and directly attached to the steel stud flanges on the opposite partition side. THERMAFIBER SAFB, 3" thick and 25" wide are inserted and creased in the partition cavity. Because the "creased" THERMAFIBER blanket is wider than the cavity, it presses against the base, thereby damping sound vibrations more effectively and offering 55 STC sound ratings. (Use of a filler strip at the base may slightly reduce STC rating.) Limiting heights for these assemblies are shown in the table below. See SA-921 for related data.

Resilient channel assemblies⁽¹⁾—typical limiting heights

Stud designation	Stud width	Stud spacing	Allow. defl.	One layer resilient partition
358ST25	3 5/8"	16"	L/240 L/360	13'4"d 11'8"d
		24"	L/240 L/360	11'8"d 10'2"d

(1) Limiting height for 5/8" thick gypsum base and 5 psf uniform load perpendicular to partition. Studs attached to top and bottom runners on resilient side. Limiting criteria: d=deflection; consult local code authority for limiting criteria.



Chase Walls

Chase walls, as vertical shafts encasing plumbing supply and wastelines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition.

The steel stud chase wall is formed of two steel studs bracketed together with 12" x chase width braces of 1/2" or 5/8" IMPERIAL Gypsum Base. As an alternate, 2 1/2" steel stud cross braces screw-attached to chase wall studs are used. When studs are not directly opposite, steel stud cross braces 24" o.c. are anchored to a horizontal 2 1/2" runner screw-attached to chase wall studs in the cavity. Limiting height for this chase wall is shown in SA-923 in this series and in SA-919 in Sweet's General Building file, section 09250; brace spacing 48" o.c. max.

Exterior Wall Furring

Exterior walls are readily furred using 1/2" Foil-Back IMPERIAL Gypsum Base screw-attached to steel framing erected vertically. The foil-back base provides an effective, low-cost vapor retarder. IMPERIAL Finish applied over the gypsum base offers a strong abrasion-resistant interior surface. In these systems, one of three different framing methods may be used to provide a vapor retarder, thermal insulation, and chase space for pipes, conduits and ducts. Note: The use and location of vapor retarder should be determined by a qualified mechanical engineer.

With UNIMAST Metal Furring Channels—These furring channels, erected vertically 16" or 24" o.c., are fastened directly to exterior walls of monolithic concrete and virtually any type of masonry—brick, concrete block, tile. With Foil-Back IMPERIAL Base screw-attached to channels and 1/16" veneer finish applied, this economical system provides an excellent vapor retarder and a durable, easily decorated interior surface.

With SHEETROCK Z-Furring Channels—Channels mechanically attach THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulation to interior of exterior walls. This system provides a self-furring solid backup for Foil-Back IMPERIAL Gypsum Base, screw-attached to the channels. Veneer finishes, applied over the base in one or two coats, offer a strong, abrasion-resistant interior surface.

SHEETROCK Z-Furring Channels, suitable for 1" to 3" thick insulation, are formed from galvanized steel for added corrosion resistance. Fire-resistant THERMAFIBER Fire Safety FS-15 Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid, spun mineral-fiber mat that meet the requirements for Class A construction. Thermal resistance (R) values are shown below.

Design thermal resistance (R) values⁽¹⁾

Wall construction	Nom. wall thickn.	Uninsul. wall	Furred wall ⁽²⁾ (no insul.)	Wall insulated with ⁽²⁾⁽³⁾			
				THERMAFIBER Fire Safety FS-15 Blankets			
				1" (4.17)	1 1/2" (6.00)	2" (8.00)	3" (12.00)
4" face brick & 8" cinder block	12"	3.01	4.38	7.63	9.46	11.46	15.46
4" face brick & 4" com. brick	8"	2.09	3.46	6.71	8.54	10.54	14.54
poured conc. (140 lb./cu. ft.)	8"	1.49	2.86	6.11	7.94	9.94	13.94
12" conc. block & 4" face brick	16"	2.57	3.94	7.19	9.02	11.02	15.02

(1) Resistances based on procedures and design values from 1981 ASHRAE Handbook of Fundamentals, winter conditions (15 mph wind) and neglect the effect of furring channels and fasteners. (2) Interior wall finish: 1/2" IMPERIAL Base (R-0.45). R-values for insulation, shown in parentheses, based on 75°F. mean temperature for insulation and components. (3) For 3/8" ROCKLATH Base (R-0.32) and 1/2" gypsum-sand-plaster (R-0.09), subtract 0.04 from table values.

With UNIMAST Steel Studs—Studs are erected vertically between floor and ceiling runners, for free-standing furring. Studs are attached to runner flanges with metal lock fastener tool or screws. Foil-Back IMPERIAL Base, screw-attached to one side of studs, serves as a superior base for veneer finish application. This free-standing furring system provides maximum clear chase space and minimizes possibilities for photographing or shadowing to occur over fasteners and furring members.

This assembly consists of stud framing which is anchored to the exterior wall with brackets at mid-height when heights greater than 12'0" are required. The adjustable wall furring bracket is anchored to the exterior wall and attached to each stud web with a 7/16" SUPER-TITE Pan Head Screw. Furring providing greater height may be constructed with wider or heavier steel studs (see tables in SA-923 in this series and in SA-919 in Sweet's General Building file, section 09250).

Column Fireproofing

In these column fireproofing assemblies, a hard and abrasion-resistant surface is obtained with a thin veneer (1/16" thick) of specially formulated, high-strength veneer finish. IMPERIAL Finish Plaster is applied over IMPERIAL FIRECODE C Gypsum Base screw attached to 1 5/8" steel studs at column corners. SHEETROCK No. 800 Corner Bead staple-applied, resists damage from impact at exterior corners.

These systems are easily and quickly installed with mechanical fasteners. They provide compact lightweight steel column fire protection up to four hours depending upon the construction. Increased fire protection of primary structural framing usually permits lower insurance premiums.

Ceilings

Ceiling systems consist of IMPERIAL Gypsum Base, FIRECODE C or regular, screw-attached to metal furring channels. These channels are clipped or wire-tied to suspended 1 1/2" channels or main supports. SUPER-TITE Screws attach the base to the furring channels. When long spans are required to fit large ducts or pipes in the ceiling space, the steel stud is used as a ceiling furring member.

These noncombustible assemblies serve as interior furred or suspended ceilings or caged beam fireproofing. They conceal and protect structural and mechanical elements with a lightweight fire-resistant ceiling that is light reflective, easily decorated and maintained. Perfectly integrated components provide hard surfaces and, if dry, are ready for next-day decoration.

Limiting spans⁽¹⁾—UNIMAST Metal Furring Members⁽²⁾

Type furring member	Furring member c. to c. spacing ⁽³⁾	Main support member ⁽¹⁾ c. to c. spacing single layer base (2.5 psf max.)
Metal Furring Channel	DWC-25 (hemmed)	16" 5'9" 24" 5'0"
	DWC-20 (unhemmed)	16" 6'11" 24" 6'0"
Steel Stud	158ST25 stud	16" 7'0" 24" 6'3"
	212ST25 stud	16" 12'8" 24" 11'0"
	358ST25 stud	16" 16'10" 24" 14'8"

(1) Between beams, joists, purlins, sub-purlins; not including 1 1/2" cold-rolled channel support spaced 4'0" max.

(2) Limiting spans for 1/2" and 5/8" thick base, max. L/240 deflection and uniform load shown. Investigate concentrated loads such as light fixtures and exhaust fans separately.

(3) 24" spacing may be used with 2-coat plastering.

Steel Framed Gypsum Lath/Metal Lath Channel Framing Systems

In these systems, gypsum or metal lath is attached to steel framing to form hollow, fire-resistant plaster partitions and suspended ceilings with superior sound control features. With slight variations, they are also suitable for core walls and wall furring.

UNIMAST Steel Studs—Roll-formed in several stud widths from corrosion-resistant steel, they have punched holes to facilitate electrical installation. Studs are twisted in place between steel runners at the floor and ceiling. ROCKLATH Plaster Base is screw-attached with power-driven, self-drilling SUPER-TITE Screws. Stud spacing is 16" o.c. for regular two-coat plaster application but may be increased to 24" o.c. which requires three-coat plaster application.

ROCKLATH Base has a gypsum core faced with special absorption paper to form a rigid base for the economical application of gypsum plasters. ROCKLATH Base is available $\frac{3}{8}$ " and $\frac{1}{2}$ " thick and in two sizes. See page 6 for information.

UNIMAST Channel Stud Framing—In these partitions, $\frac{3}{4}$ " cold-rolled channels spaced 16" o.c. are wire-tied to special angle runners at floor and ceiling. Metal lath is wire-tied 6" o.c. to the channels as a base for gypsum plaster.

Ceilings and Soffits—UNIMAST Junior Diamond Mesh Lath and gypsum plaster, attached to a conventional cold-rolled channel grillage system, are furred and suspended from the construction above. These systems serve to conceal and protect structural and mechanical elements and can also be formed to flat surfaces or complex contoured shapes. Easily decorated to provide unlimited design options.

Column Fireproofing—Metal lath, plain or self-furring, held in place around columns with channels and tie wire, provides lightweight, compact fire protection for steel columns.

Exterior Wall Furring—It is recommended that all exterior walls be furred. ROCKLATH Plaster Base, $\frac{3}{8}$ " or $\frac{1}{2}$ "x16"x96", and plaster may be used with framing methods shown on page 13.

Chase Walls—Chase walls are easily constructed using steel studs, ROCKLATH Plaster Base and $\frac{1}{2}$ " plaster, provided proper cross-bracing is specified within the cavity.

Features

Versatility—Systems are suitable for divider, corridor, party walls, suspended ceilings and soffits in every type of new construction—commercial, institutional and industrial—whenever smooth, hard, sanitary surfaces are required. Adapt easily to most modules and dimensions and when framed with metal lath readily adapt to curved designs.

Fire Resistance—Noncombustible components provide partition systems with 1-hour ratings and ceiling, beam and column fireproofing fire readings of 1 to 4 hours.

Sound Control—The systems offer sound attenuation suitable for party walls at a low cost.

Lightweight—These systems weigh appreciably less than masonry partitions of the same thickness.

Strength—High structural integrity of gypsum lath and plaster provides abuse-resistant, easily maintained, durable surfaces.

Economical—Plasters are readily pumped and spray-applied. The hollow construction simplifies fixture attachment and installation of conduit and piping. Systems provide an ample cavity for thermal and sound insulation.

Limitations

- 1 Non-load bearing.
- 2 A 3-coat plaster application over metal lath is required.

- 3 Door frames must be fabricated, anchored and grouted to prevent twisting and impact vibration.
- 4 Where mechanically suspended acoustical tile ceilings are used, finished partitions should extend between structural floor slabs, closing all openings, with perimeter relief as required.
- 5 Consult SA-923 to determine final stud selection.

Performance Selector

In the preparation of plastering specifications, consideration should be given to the selection of materials not only for compatibility, but for the quality of the structure to be plastered. Since ANSI and AIA specifications are based on minimum standards, they should be followed only in applications where minimum quality is desired. It is wise to upgrade plastering specifications wherever possible. Following are general recommendations listed in the order of preference—No. 1 in each case being expected to produce the highest quality results.

Basecoat Plaster (over metal lath)

Scratch Coat	Brown Coat
1. STRUCTO-BASE ⁽¹⁾ Plaster, sanded 100 lbs.: 2 cu. ft.	STRUCTO-BASE Plaster, sanded 100 lbs.: 3 cu. ft.
2. Wood Fiber, neat, or sanded up to 100 lbs.: 1 cu. ft.	Wood Fiber Plaster, sanded up to 100 lbs.: 1 cu. ft.
3. Wood Fiber, neat, or sanded up to 100 lbs.: 1 cu. ft.	RED TOP Gypsum Plaster, sanded 100 lbs.: 2 cu. ft.
4. RED TOP Gypsum Plaster, sanded 100 lbs.: 2 cu. ft.	RED TOP Gypsum Plaster, sanded 100 lbs.: 3 cu. ft.
5. Wood Fiber, neat, or sanded up to 100 lbs.: 1 cu. ft.	STRUCTO-LITE Plaster (sand float finish only)
6. Wood Fiber, neat, or sanded 100 lbs.: 1 cu. ft.	RED TOP Gypsum Plaster, perlited 100 lbs.: 2 cu. ft. (sand float finish only)

(1) Verify availability with your local United States Gypsum Company sales representative.

Basecoat Plaster (over ROCKLATH Plaster Base)

See "Use of Aggregates" table, page 4.

Aggregates

1. Sand	3. Job-mixed Perlite
2. Mill-mixed Perlite	4. Job-mixed Vermiculite

Note: Lightweight aggregates should not be used on a construction where sound isolation is a consideration.

Veneer Finishes (over IMPERIAL Gypsum Base)

1. IMPERIAL Basecoat and IMPERIAL Finish (two-coat system)
2. IMPERIAL Basecoat and DIAMOND Interior Finish (two-coat system)
3. IMPERIAL Basecoat and other appropriate gauged-lime putty finish (two-coat system)
4. DIAMOND Veneer Basecoat Plaster and DIAMOND Interior Finish Plaster (two-coat system)
5. DIAMOND Veneer Basecoat Plaster and other appropriate gauged-lime putty finish (two-coat system)
6. IMPERIAL Finish (one-coat system)
7. DIAMOND Interior Finish (one-coat system)
8. Norfolk Special Veneer Plaster or Florida Finish Veneer Plaster (one-coat system)

Finish Coats

Float Finishes

1. IVORY or SNOWDRIFT Lime (92% hydrate), Keenes Cement and white silica sand
2. GRAND PRIZE or RED TOP Lime, RED TOP Gauging and white silica sand

Smooth Trowel Finishes

1. IVORY or SNOWDRIFT Lime and STRUCTO-GAUGE Plaster
2. RED TOP Finish
3. IVORY or SNOWDRIFT Lime, RED TOP Gauging, with $\frac{1}{2}$ cu. ft. of perlite fines or fine silica sand
4. IVORY or SNOWDRIFT Lime and Keenes Cement
5. GRAND PRIZE or RED TOP Lime, and RED TOP Gauging Plaster

NOTE: Float Finish 1 and Trowel Finish 3 (except over metal lath) are the only finishes recommended for use over a basecoat containing lightweight aggregate. Smooth Trowel Finishes 1, 2 and 4 provide high abrasion resistance and because of their hardness must be used over a comparably hard basecoat (see limitations, page 5).

STRUCTOCORE Security Wall System

STRUCTOCORE Security Wall Systems consist of specially formed steel sheets that provide continuous reinforcement for cementitious fireproofing material. Designed for security walls in jails, prisons, correctional facilities; walls for security rooms and vaults at banks and currency exchanges; secured storage areas for computer data, financial records; and for retailers such as furriers with large, valuable inventories.

The system is constructed from STRUCTOCORE Steel Forming and STRUCTO-BASE Gypsum Plaster finished with IMPERIAL Finish Plaster. A portland cement matrix can be used as an alternative. STRUCTOCORE forming is available in 12-, 14-, 16-, and 18-ga. galvanized steel mesh sheets. When sheets overlap they interlock, producing a reinforced intersection permitting fast, simple installation. STRUCTOCORE Sheets are welded or screwed to 18-ga. perforated steel angles that are securely anchored to floor and ceiling. High-strength machine-applied STRUCTO-BASE Plaster is sprayed to both sides of STRUCTOCORE Sheets to a min. $3\frac{1}{2}$ " thickness. IMPERIAL Finish Plaster (nominal 3000-psi compressive strength) is hand troweled over STRUCTO-BASE Plaster, producing a cost-effective, durable, maintenance-resistant wall system. See SA-1119 STRUCTOCORE Security Wall Systems for complete system specifications.

Features

Smooth Monolithic Wall Surfaces—Walls provide superior appearance compared to masonry systems and are easier to clean. Painting requirements and costs are reduced considerably.

Space Saving Construction—Thin partition thicknesses of only $3\frac{1}{2}$ ", 4" or $4\frac{1}{2}$ " provide more usable floor space.

High Strength—Continuous reinforced-steel core offers a penetration and outbreak barrier providing various levels of security. If the plaster or cement matrix is attacked, STRUCTOCORE Sheets maintain their integrity for continued security. Acceptable for Zone 4 seismic applications.

Lightweight—A $3\frac{1}{2}$ " thick partition weighs approximately 35 psf, considerably less than concrete masonry units. Ideal for retrofit applications.

Fire-Resistance—A 4" thick, 18-ga. system provides a 2-hour fire rating based on UL Design U476.

Economical—Faster installation than more costly, thicker and heavier concrete or fully grouted masonry construction. Freestanding steel core can be welded in place, attached by screws, or integrated with other approved framing components or systems. Simplifies electrical and mechanical installation. In-place costs are competitive with costs for reinforced and filled concrete block walls.

Versatility—STRUCTOCORE Sheets are available in three sizes. Sheets can be overlapped and welded or screwed together forming a continuous steel grid to fit needed room size. This minimizes scrap. Wall thicknesses can be adapted readily to meet design needs. Fixture support up to 4850 lbs. is obtainable.

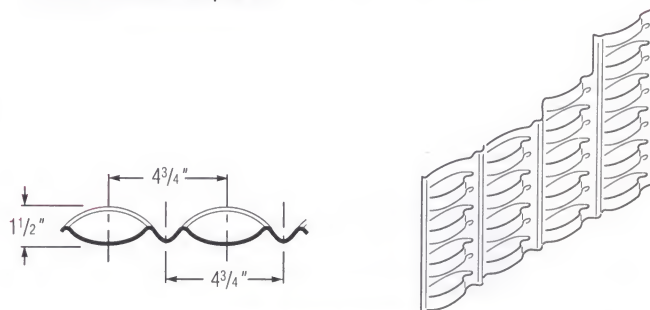
Easy Maintenance—Walls require little upkeep. Damaged areas are easier to repair and maintain than masonry walls. Maintenance is with readily available materials.

Bullet Penetration Protection—STRUCTOCORE Wall, STRUCTO-Base/Sand Plaster, $4\frac{1}{2}$ "-thick, 18-ga., met SD-STD-01.02 for a sub-machine gun level of ballistic threat (tested at H.P. White Laboratory, Inc.).

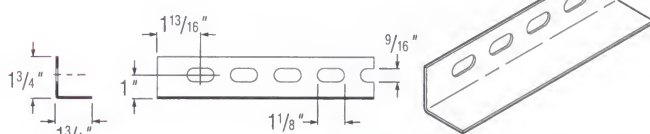
STRUCTOCORE Wall, 3000 psi min., plaster wall, $4\frac{1}{2}$ "-thick, 12-ga., #4 rebars, met SD-STD-01.02 for a rifle level of ballistic threat and successfully demonstrated compliance with the forced entry requirements of SD-STD-1.01 for 15 min. (per test reported by H.P. White Laboratory, Inc.).

Limitations

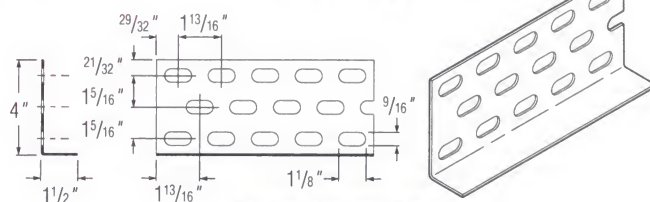
- 1 Non-load bearing.
- 2 Maximum height of 18'0" for unbraced ceiling (at 5 psf not exceeding a deflection of $L/360$ span).
- 3 Temporary horizontal bracing is required at mid-height to plumb the forming until the plaster scratch coat has been applied and set.
- 4 The length between control joints not to exceed 22'.
- 5 Supplemental forming reinforcement is required and should be designed for any fixture or opening where loads in excess of 2200 lbs. are anticipated.



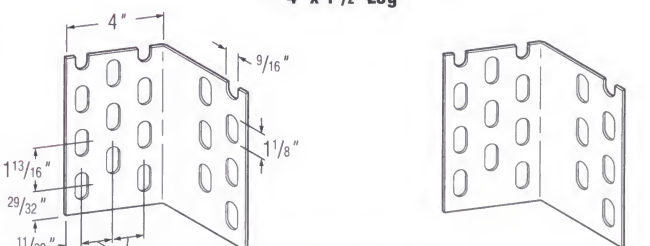
STRUCTOCORE Forming Sheet



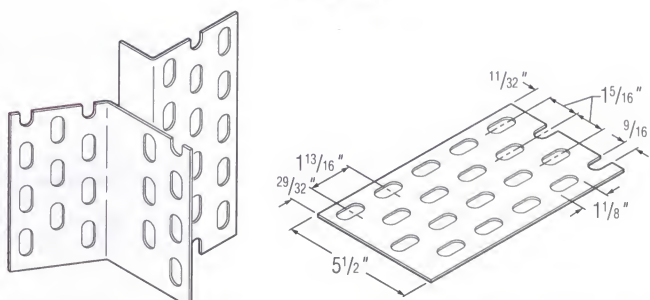
Floor-Ceiling Angle
 $1\frac{3}{4}$ " x $1\frac{3}{4}$ " Leg



Vertical Abutment Angle
4" x $1\frac{1}{2}$ " Leg



135° Intersection Angle
4" x 4" Leg



Vertical Abutment Angle
with 135° Intersection Angle

STRUCTOCORE Flat Accessory Plate
 $5\frac{1}{2}$ " x 8'

Construction System Selector

Wood Framed Veneer Plaster Partitions



Sound-deadening material.

RC-1™ Resilient Channels.

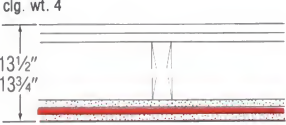
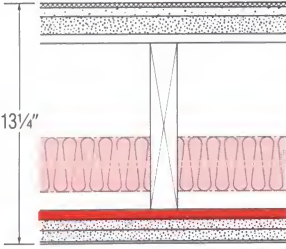
Furring channels.

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1 hr. est	 6" wt. 11	Wd Stud—Resil 5/8" IMPERIAL FIRECODE C gypsum base & veneer finish—2x4 16" o.c.—2 layers base one side screw att & lamin—single layer opp side screw att to RC-1 chan—3" THERMAFIBER SAFB—1/16" veneer finish both sides—perimeter caulked—est. fire rating based on UL Des U311	53	CK-654-38	A
1 hr.	 5 3/8" wt. 8	Wd Stud—Resil 5/8" IMPERIAL FIRECODE C gypsum base & veneer finish—2x4 16" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—base att with 1" Type S screws—opp side att direct with 1 1/4" Type W screws—1/16" veneer finish both sides—perimeter caulked—UL Des U311	52 49	SA-830702 Based on 1/2" gypsum base —CK-664-4	B
1 hr.	 4 5/8" wt. 7	Wd Stud—1/2" IMPERIAL FIRECODE C gypsum base att direct & veneer finish—2x4 16" o.c.—base nailed 7" o.c. 6d nails—1/16" veneer finish—joints taped—U of C 10-27-64	N/A		C
1 hr.	 4 7/8" wt. 7	Wd Stud—5/8" IMPERIAL FIRECODE gypsum base & veneer finish—2x4 16" o.c.—base nailed 7" o.c. 1 7/8" cem ctd nails—1/16" veneer finish both sides—UL Des U305	N/A		D
1 hr.	 9" wt. 7	Wd Stud—5/8" IMPERIAL FIRECODE C gypsum base & veneer finish—2x4 24" o.c.—1 1/2" THERMAFIBER SAFB (optional)—base nailed 7" o.c.—1/16" veneer finish both sides—joints taped—UL Des U340	N/A		E
2 hr.	 6 1/8" wt. 12	Wd Stud—2 layers 5/8" IMPERIAL FIRECODE gypsum base & 1/16" veneer finish both sides—2x4 16" o.c.—base layer 6d nails 6" o.c.—face layer 8d nails 8" o.c.—joints taped—UL Des U301	N/A		F



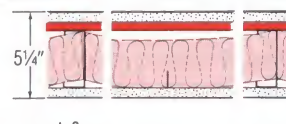
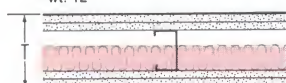

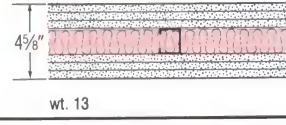
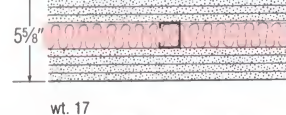
Wood Framed Veneer Plaster Ceilings

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.	 1 1/2" clg wt. 3	1/2" IMPERIAL FIRECODE C gypsum base & veneer finish ceiling—2x10 wd joist 16" o.c.—1" nom wd sub & fin flr—gypsum base att with 5d nails 6" o.c.—1/16" veneer finish—joints taped—UL Des L512	N/A		A
1 hr.	 5/8" clg wt. 3	5/8" IMPERIAL FIRECODE gypsum base & veneer finish ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—base att with 6d nails 6" o.c.—1/16" veneer finish—joints taped—UL Des L501	N/A		B
1 hr.	 1 1/2" clg wt. 3	Resil 1/2" IMPERIAL FIRECODE C gypsum base & veneer finish ceiling—2x10 wd joist 16" o.c.—1" nom wd sub & fin flr—RC-1 chan spaced 16" o.c. and at end joints—base att with Type S screws 12" o.c.—1/16" veneer finish—joints taped—UL Des L514	N/A		C
1 hr.	 5/8" clg wt. 3	5/8" IMPERIAL FIRECODE gypsum base & veneer finish ceiling—double 2x10 or single 4x10 wd joist 48" o.c.—met fur chan—base att with 1" Type S screws 12" o.c.—1/16" finish—joints taped—furring channel spacing at 16" o.c. recommended—UL Des L508	N/A		D
1 hr.	 14 1/4" clg wt. 3	5/8" IMPERIAL FIRECODE C gypsum base & veneer finish ceiling—2x12 wd truss 24" o.c.—3/4" nom plywd flr—met fur chan 24" o.c. wire-tied to trusses—base att with 1" Type S screws 12" o.c.—1/16" veneer finish—joints taped—UL Des L528	N/A		E

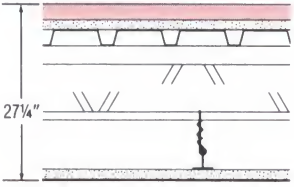
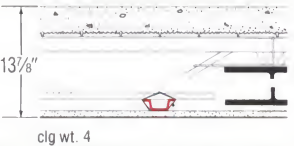
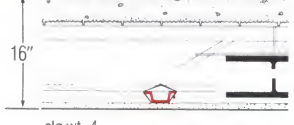
Wood Framed Veneer Plaster Ceilings

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1½ hr.		Resil 2 layers ½" IMPERIAL FIRECODE C gypsum base & veneer finish ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan 24" o.c. screw att over base layer—face layer screw att to chan 12" o.c.—½" veneer finish—joints taped— UL Des L510 —2 hr. sys with ½" IMPERIAL FIRECODE C gypsum base— UL Des L511	N/A	Assemblies not recommended when sound control is a major consideration	F
2 hr.					
2 hr.		Resil 2 layers ½" IMPERIAL FIRECODE C gypsum base & veneer finish over RC-1 chan 16" o.c.—2x10 wd joists 16" o.c.—3" THERMAFIBER SAFB—floor of 8"x8" ceramic tile, ½" DUROCK exterior cement board, 1" SHEETROCK brand gypsum liner panels, ½" plywood— UL Des L541	60	Based on drywall ceiling— RAL-TL89-141	G
			58	Based on drywall ceiling plus vinyl tile over oriented strand board in place of ceramic tile and cement board— RAL-TL89-145	
			59	Based on drywall ceiling plus carpet/pad over oriented strand board in place of ceramic tile and cement board— RAL-TL89-146	

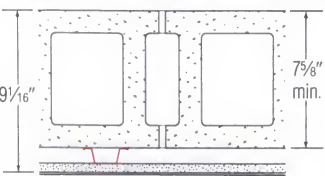
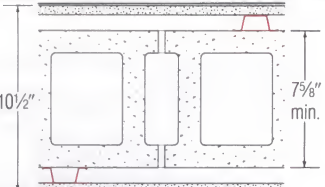
Steel Framed Veneer Plaster Partitions

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.		Steel Stud—½" IMPERIAL FIRECODE C gypsum base and veneer finish—2½" studs—base screw att—joints stag and taped—½" veneer finish—perimeter caulked—stud spacing at 16" recommended— GA-WP-1240	45	Based on 3½" studs 24" o.c. with 1" SAFB in cavity— CK-664-1	A
1 hr.		Steel Stud—½" IMPERIAL FIRECODE gypsum base and veneer finish—3½" studs 24" o.c.—single layer base vert or horiz appl & screw att—joints stag and taped—½" veneer finish—perimeter caulked— UL Des U465 —based on panels horiz appl— GA-WP-1200	50	Based on 3" SAFB 25" wide, creased to fit cavity— SA-860620	B
1 hr.		Steel Stud—Resil ½" IMPERIAL FIRECODE gypsum base and veneer finish—3½" studs 24" o.c.—3" THERMAFIBER SAFB 25" wide creased to fit cavity—RC-1 chan 24" o.c. screw att one side—base vert appl & screw att—½" veneer finish—perimeter caulked— UL Des U451	55	SA-860635	C
2 hr.		Steel Stud—2 layers ½" IMPERIAL FIRECODE gypsum base and veneer finish—3½" or 3¾" studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints taped—½" veneer finish— UL Des U411	47 51	Based on 2½" studs— TL-75-73 Based on 2½" studs and 1½" SAFB in cavity— TL-75-70	D
2 hr.		Steel Stud—2 layers ½" IMPERIAL FIRECODE C gypsum base and veneer finish—2½" or 3¾" studs 24" o.c.—2" THERMAFIBER SAFB stapled one side—base appl vert and joints stag—base layer screw att—face layer strip lamin or screw att—joints taped—½" veneer finish—perimeter caulked—rating based on assembly with or without SAFB— UL Des U412	53	Based on assembly with 2½" studs and 1" SAFB in cavity— CK-654-66	E
3 hr.		Steel Stud—3 layers ½" IMPERIAL FIRECODE C gypsum base and veneer finish—1¾" studs 24" o.c.—base layers appl vert—face layer appl horiz—base screw-att with joints stag—½" veneer finish—rating applies to assembly with or without SAFB— UL Des U435	59	Based on assembly with 1½" SAFB in cavity— SA-830112	F
4 hr.		Steel Stud—4 layers ½" IMPERIAL FIRECODE C gypsum base and veneer finish—1¾" studs 24" o.c.—base layers appl vert—face layer appl horiz—base screw-att with joints stag—½" veneer finish—rating applies to assembly with or without SAFB— UL Des U435	62	Based on assembly with 1½" SAFB in cavity— SA-830113	G

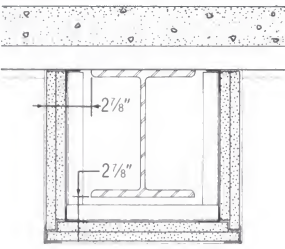
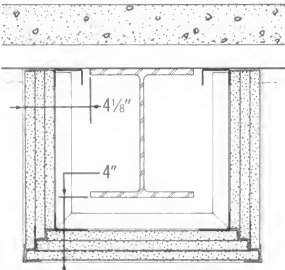
Steel Framed Veneer Plaster Ceilings

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1½ hr.		5/8" IMPERIAL FIRECODE C gypsum base and veneer finish ceiling—susp grid with main run 4' o.c. and cross tees 2' o.c.—base screw-att below grid—joints stag and taped—min 1" roof insul and 5/8" gypsum bd on steel deck over bar joists—1 hr. rating based on assembly with ½" thick base— UL Des P510	N/A		A
2 hr. (beam 2 hr.)		½" IMPERIAL FIRECODE C gypsum base and veneer finish ceiling furred or susp—met fur chan—base att with screws 12" o.c.—joints taped—1/16" veneer finish—2½" conc on riblath over bar joist—furring channel spacing at 16" o.c. recommended— UL Des G515	N/A		B
3 hr. (beam 3 hr.)		5/8" IMPERIAL FIRECODE C gypsum base and veneer finish ceiling—met fur chan—base att with 1" Type S screws 12" o.c.—joints exp or taped—1/16" veneer finish—3" conc on corrugated steel deck or on riblath over bar joist—furring channel spacing at 16" o.c. recommended— UL Des G512	N/A		C

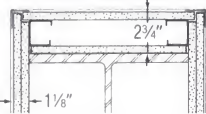
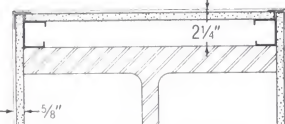
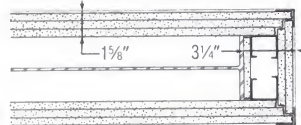
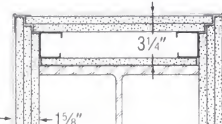
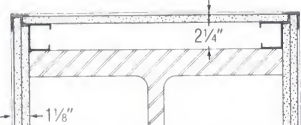
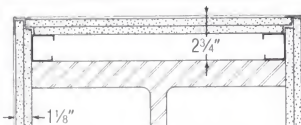
Concrete Block Veneer Plaster Partitions

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
3 hr.		Concrete Blk (UL Classified)—½" IMPERIAL FIRECODE C gypsum base & veneer finish—7/8" deep met fur chan 24" o.c.—base att with 1" drywall screws 8" o.c. at butt joints, 12" o.c. in field—1/16" veneer finish—joints taped— UL Des U914	N/A		A
4 hr.		Concrete Blk (UL Classified)—½" IMPERIAL FIRECODE C gypsum base & veneer finish both sides—7/8" deep met fur chan 24" o.c.—base att with 1" drywall screws 8" o.c. at butt joints, 12" o.c. in field—1/16" veneer finish—joints taped— UL Des U910	N/A		B

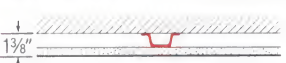



Steel Framed Veneer Plaster Beams

Fire rating	Beam type	Fire-rated construction		Comments	System reference
		Detail & physical data	Description & test no.		
2 hr. (beam only)	W8 x24		Gypsum Base and Veneer Finish Fireprfg—1 5/8" steel run chan brackets 24" o.c.—1 3/8"x1 3/8" corner angles att to chan brackets—dbl layer 5/8" IMPERIAL FIRECODE base att with Type S screws—met beads on corners—1/16" veneer finish—2 1/2" conc deck on fluted stl flr— UL Des N501—UL Des N502	Design N502 based on 1 5/8" steel runner for corner angles and coped brackets	A
3 hr. (beam only)	W8 x24		Gypsum Base and Veneer Finish Caged Beam Fireprfg—1 5/8" steel run chan brackets 24" o.c.—1 3/8"x1 3/8" corner angles att to chan brackets—3 layers 5/8" IMPERIAL FIRECODE base att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints taped—1/16" veneer finish—2 1/2" conc deck on fluted steel flr— UL Des N505	Fire rating for restrained assembly; 2-hr. rating for unrestrained assembly	B

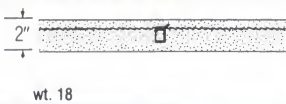
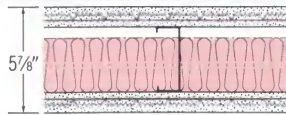
Steel Framed Veneer Plaster Column Fireproofing

Fire rating	Column type	Fire-rated construction Detail & physical data	Description & test no.	Comments	System reference
2 hr.	W10 x49		Gypsum Base and Veneer Finish Fireprtg—2 layers 1/2" IMPERIAL FIRECODE C gypsum base around col—double layer over ea flange end—double layer on flange faces separ by 1 5/8", 25-ga. steel studs & screw att—met beads on corners—1/16" veneer finish— UL Des X518		A
2 hr.	W14 x228		Gypsum Base and Veneer Finish Fireprtg—1/2" IMPERIAL FIRECODE C gypsum base around col—base screw att to 1 5/8", 25-ga. steel stud at col corners—met corner beads—1/16" veneer finish— UL Des X521		B
2 hr.	varies		Gypsum Base and Veneer Finish Fireprtg—3 layers 1/2" IMPERIAL FIRECODE C gypsum base around col—triple layer over ea flange end—inner layer on flange face separ by 1 5/8", 25-ga. steel studs & screw att—met beads on corners—1/16" veneer finish— UL Des X524	Rating applies to tapered or constant-section prefabricated metal building columns	C
3 hr.	W10 x49		Gypsum Base and Veneer Finish Fireprtg—3 layers 1/2" IMPERIAL FIRECODE C gypsum base around col—triple layer over ea flange end—inner layers on flange face separ by 1 5/8", 25-ga. steel studs & screw att—met beads on corners—1/16" veneer finish— UL Des X515		D
3 hr.	W14 x228		Gypsum base and veneer Finish Fireprtg—1/2" IMPERIAL FIRECODE C gypsum base around col—double layer over ea web face—base screw att to 1 5/8", 25-ga. steel studs at col corners—met corner beads—1/16" veneer finish— UL Des X514		E
4 hr.	W14 x228		Gypsum Base and Veneer Finish Fireprtg—2 layers 1/2" IMPERIAL FIRECODE C gypsum base around col—base screw att to 1 5/8", 25-ga. steel studs at corners—met corner beads—1/16" veneer finish— UL Des X507		F


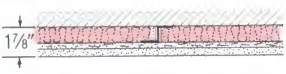
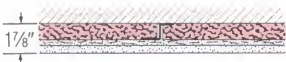
Steel Framed Veneer Plaster Exterior Wall Furring

Detail & physical data	Description	Comments	
	Metal furring channels 16" o.c., 1/2" Foil-Back IMPERIAL gypsum base screw-attached to channels, 1/16" veneer finish	Good vapor retarder; no limiting height	A
	Steel studs 16" o.c. set in runners, 1/2" Foil-Back IMPERIAL gypsum base screw-attached to studs, 1/16" veneer finish	Free-standing; allows for pipe chase clearance; good vapor retarder	B
	SHEETROCK Z-furring channels applied vertically 24" o.c., THERMAFIBER fire safety FS-15 insulation between channels, 1/2" foil-back IMPERIAL gypsum base screw-attached to channels, 1/16" veneer finish	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation; good vapor retarder; no limiting height	C
	SHEETROCK Z-furring channels applied vertically 24" o.c., rigid foam insulation between channels, 1/2" foil-back IMPERIAL gypsum screw-attached to channels, 1/16" veneer finish	Suitable for up to 3" thick insulation; no limiting height	D

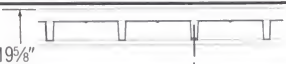

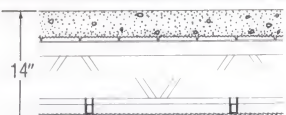
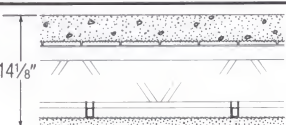
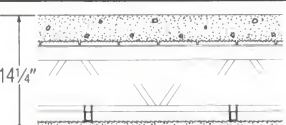
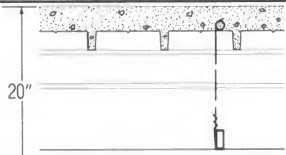
Steel Framed Gypsum Lath & Plaster Partitions

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.		2" Solid Metal Lath & Plaster— $\frac{3}{4}$ " cr chan 16" o.c.—2.5-lb. metal lath wire-tied to chan—100:2-100:2 gypsum sand plaster— MLA T-129 OSU	37	NBS-523 F45	A
2 hr.		Steel Stud— $2\frac{1}{2}$ " studs 16" o.c.— $\frac{3}{8}$ " ROCKLATH base, both sides, 8" o.c.—3.4-lb. self-furring diamond mesh lath, both sides, 8" o.c.— $\frac{3}{4}$ " gypsum sand plaster, both sides— UL U484	N/A		B

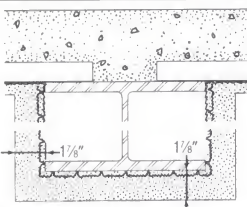
Steel Framed Gypsum Lath & Plaster Exterior Wall Furring

Detail & physical data	Description	Comments	System reference
	Steel studs 16" o.c. set in runners, $\frac{3}{8}$ " ROCKLATH base attached with 1" Type S screws, $\frac{1}{2}$ " sanded basecoat plaster, lime putty finish	Free standing; allows for pipe chase clearance; good vapor retarder	A
	SHEETROCK Z-furring channels applied vertically 16" or 24" o.c., THERMAFIBER fire safety FS-25 blankets between channels, $\frac{3}{8}$ " ROCKLATH base attached with 1" Type S screws, $\frac{1}{2}$ " sanded basecoat plaster, lime putty finish	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation; no limiting height	B
	SHEETROCK Z-furring channels applied vertically 16" or 24" o.c., rigid plastic foam insulation between channels, $\frac{3}{8}$ " ROCKLATH base attached with 1" Type S screws, $\frac{1}{2}$ " sanded basecoat plaster, lime putty finish	Suitable for up to 3" thick insulation; no limiting height.	C

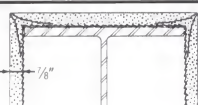
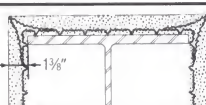
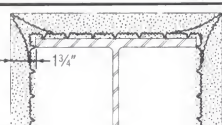
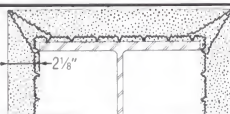
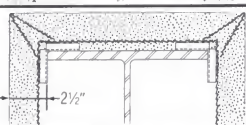
Steel Framed Metal Lath & Plaster Ceilings

Fire rating	Fire-rated construction	Description & test no.	Comments	System reference
	Detail & physical data			
1 1/2 hr.		Suspended 3.4 # diamond mesh metal lath & $\frac{3}{4}$ " 100:2-100:3 gypsum-sand plaster—rib type steel roof deck with 1" wood-fiber insulation— NBS-57		A
1 1/2 hr.		Suspended 3.4 # diamond mesh metal lath & 1" 100:2 gypsum-sand plaster—rib type steel roof deck with 1 1/2" wood-fiber insulation— NBS-58		B
2 hr.		$\frac{3}{4}$ " cold rolled channel furred or suspended—3.4 # diamond mesh metal lath & $\frac{3}{8}$ " 100:2-100:3 gypsum-sand plaster— $2\frac{1}{2}$ " concrete on riblath or 28 ga. corrugated steel deck over bar joist— BMS-92, R4024-12		C
2 1/2 hr.		$\frac{3}{4}$ " cold rolled channel furred or suspended—3.4 # diamond mesh metal lath & $\frac{3}{4}$ " 100:1-100:1 gypsum wood fiber-sand plaster— $2\frac{1}{2}$ " concrete on riblath or 28 ga. corrugated steel deck over bar joist— UL Des R5429-1, R4024-12		D
3 hr.		$\frac{3}{4}$ " cold rolled channel furred or suspended—3.4 # diamond mesh lath & $\frac{7}{8}$ " neat wood fiber gypsum plaster— $2\frac{1}{2}$ " concrete on riblath or 28 ga. corrugated steel deck over bar joist— BMS-92, R4024-12		E
4 hr. (beam 4 hr.)		$\frac{3}{4}$ " cold rolled channel 13" o.c. suspended 3 1/2" below beam—3.4 # diamond mesh metal lath & $\frac{7}{8}$ " STRUCTO-LITE (Type S) plaster—2" concrete over fluted steel floor— UL Des D401		F

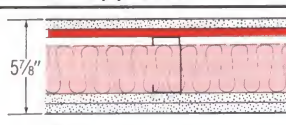
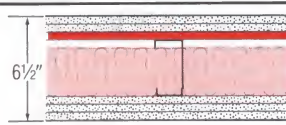
Steel Framed Metal Lath & Plaster Beam

Fire rating	Fire-rated construction		Comments	System reference
	Detail & physical data	Description & test no.		
4 hr.		Caged Beam Fireproofing—3.4# self-furring diamond mesh metal lath enclosing beam—1 1/2" 100:2 gypsum-perlite plaster— UL 40 UL8.16, UL Des D403	Suitable for protection of beams and girders	A

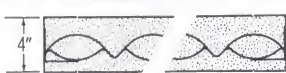
Metal Lath & Plaster Column Fireproofing

Fire rating	Column type	Fire-rated construction		Comments	System reference
		Detail & physical data	Description & test no.		
1 hr.	W10 x49		3.4# diamond mesh metal lath wrapped around column—3/4" 100:2-100:3 gypsum-sand plaster— BMS-92		A
2 hr.	W10 x49		3.4# self-furring diamond mesh metal lath wrapped around column—1 3/8" 100:2-100:3 gypsum-perlite plaster or STRUCTO-LITE— UL Des X402		B
3 hr.	W10 x49		3.4# self-furring diamond mesh metal lath wrapped around column—1 3/4" 100:2-100:3 gypsum-perlite plaster or STRUCTO-LITE— UL Des X402		C
4 hr.	W10 x49		3.4# self-furring diamond mesh metal lath wrapped around column—1 3/4" STRUCTO-LITE or 100:2-100:3 gypsum-perlite plaster— UL Des X402		D
4 hr.	W10 x49		3.4# diamond mesh metal lath furred 1/2" from face of column—1 7/8" STRUCTO-LITE plaster with fill between flange face & lath— UL Des X405		E

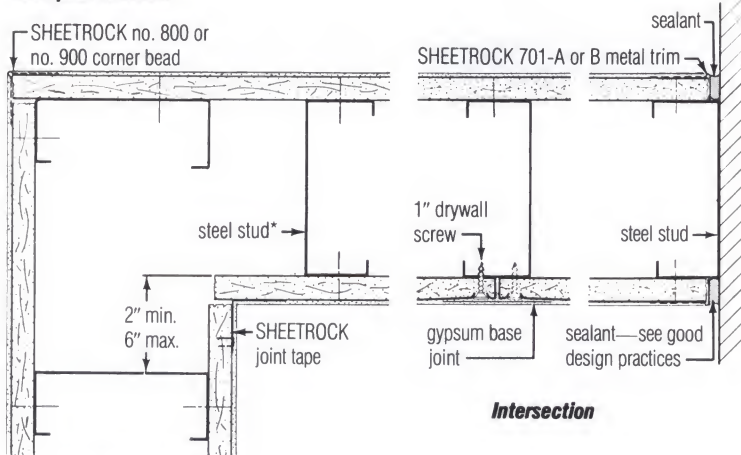
High Performance Sound Control: Resilient Steel Framed Partitions

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 1/2 hr.	 wt. 8	Resil Stud Plaster—5 5/8" IMPERIAL FIRECODE C gypsum base and veneer finish—35SJ20 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—1/16" veneer finish—perimeter caulked— UL Des U452	58	RAL-TL 83-215 (52 MTC)	A
3 hr.	 wt. 12	Resil Stud Plaster—1/2" IMPERIAL FIRECODE C gypsum base and veneer finish—35SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers screw-att to studs, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—1/16" veneer finish—perimeter caulked— UL Des U455	61 62	RAL-TL-87-153 (56 MTC) Based on 3/8" thick panels— RAL-TL-83-213 (59 MTC)	B

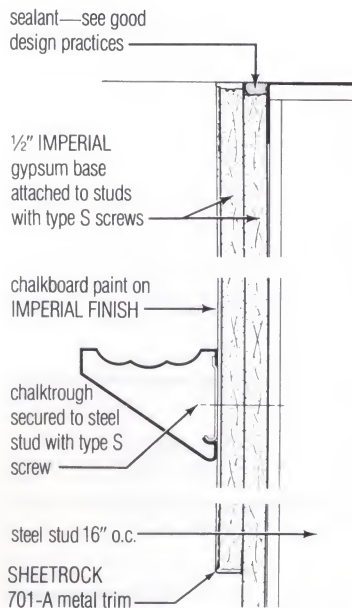
STRUCTOCORE Security Wall System

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr.		STRUCTOCORE 18-ga. steel panels att to 18-ga. steel perimeter channels—3/4" min. coverage STRUCTO-BASE gypsum plaster sanded at 2:1 by weight in two coats—IMPERIAL finish plaster applied 3/32" thick— UL Des U476	N/A		A

Wall plan sections

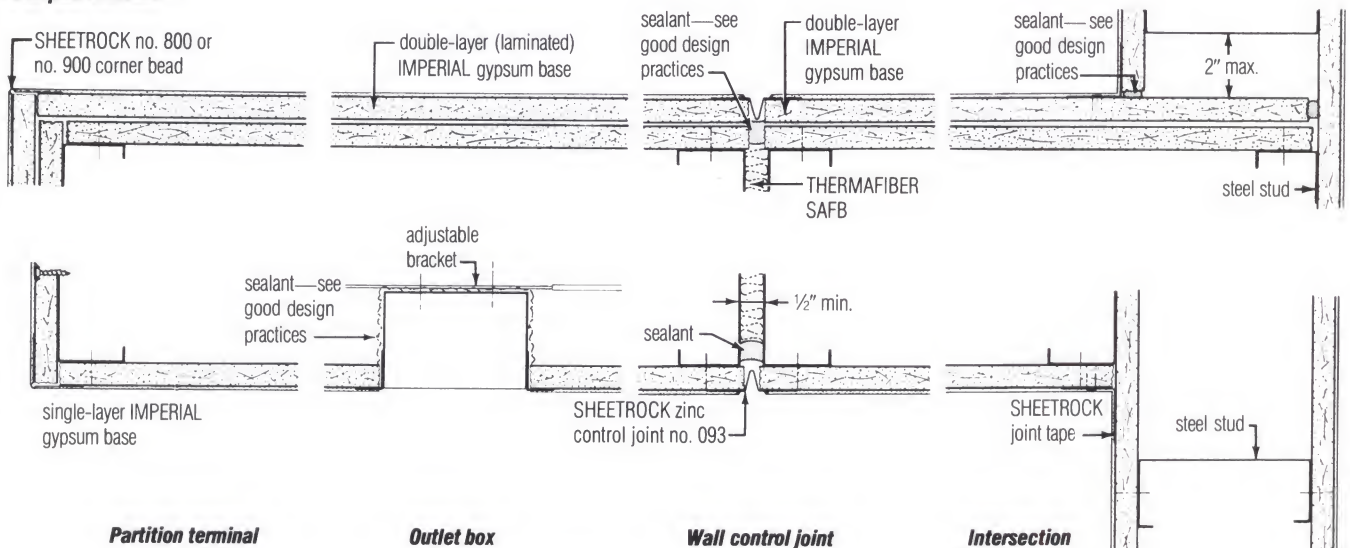


Intersection



Plaster chalkboard

Wall plan sections



Partition terminal

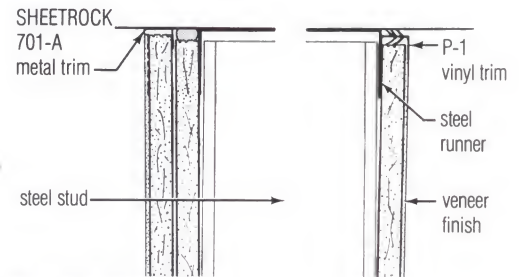
Outlet box

Wall control joint

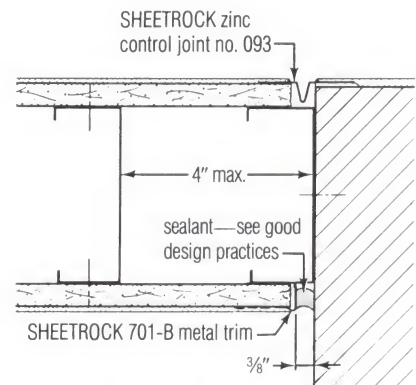
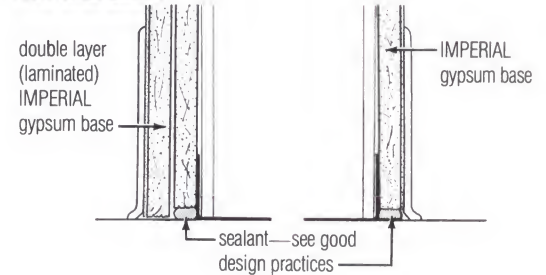
Intersection

Ceiling attachment

scale: 3" = 1'-0"

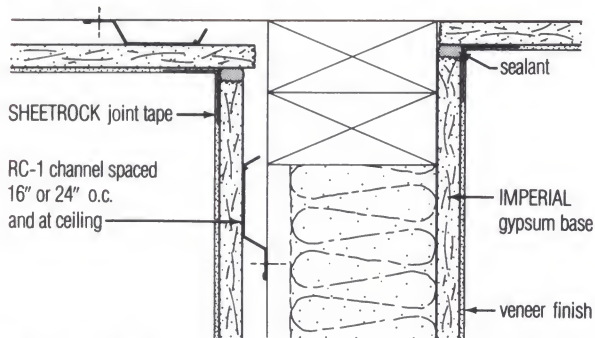


Floor attachments

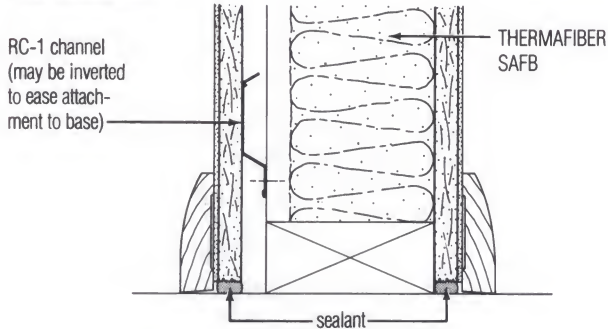


Perimeter relief and control joint
wall or column intersection

Ceiling attachment

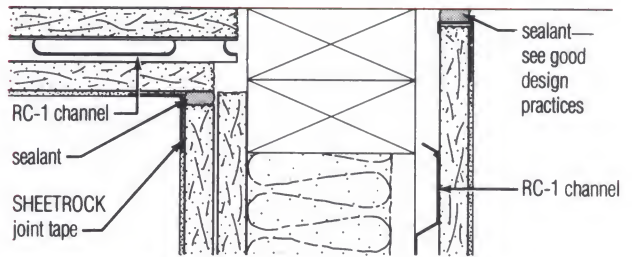


Floor attachment

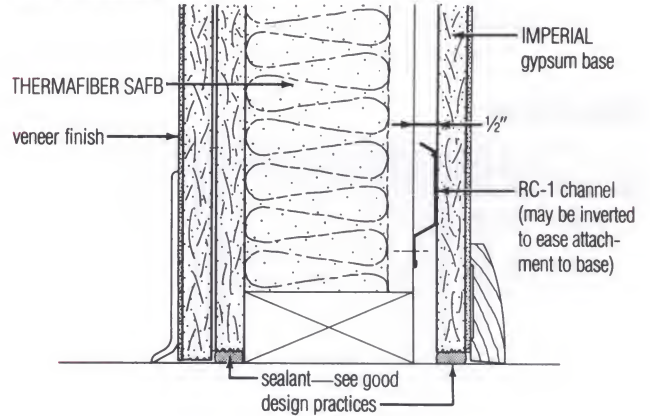


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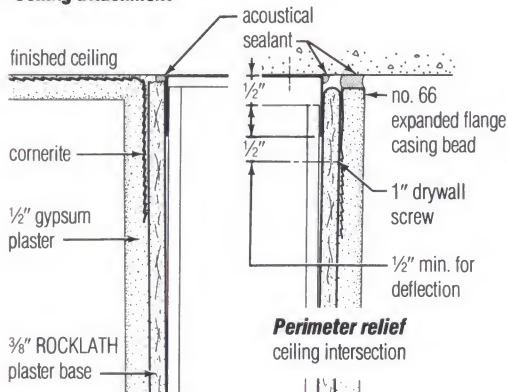
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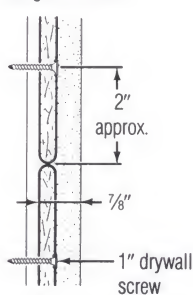
Floor attachment



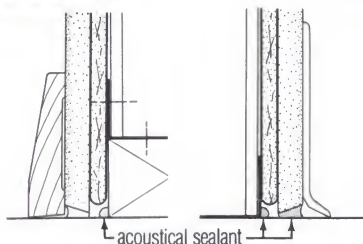
Ceiling attachment



Perimeter relief ceiling intersection

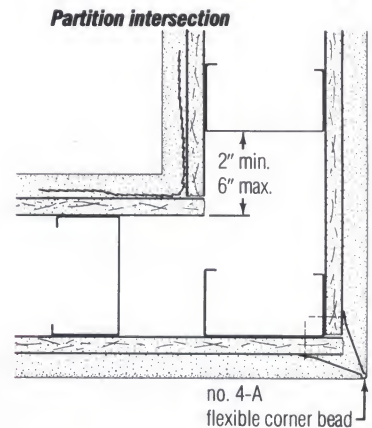
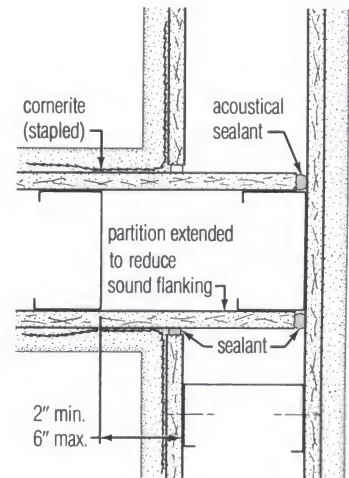
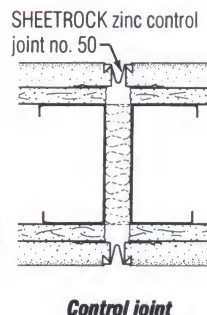
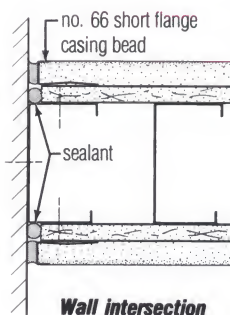


Floor attachments

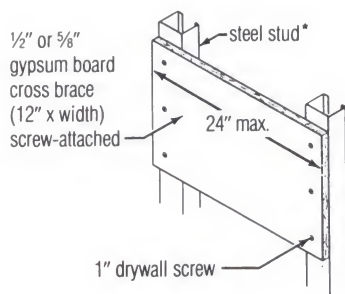


Wood

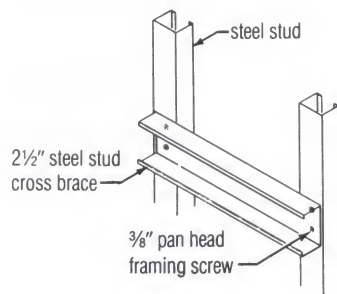
Top set



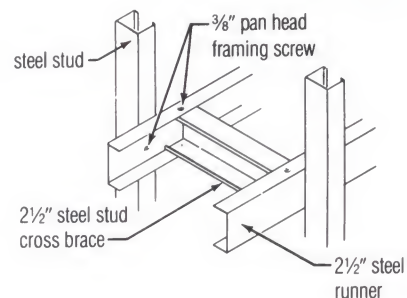
Partition corner



Gypsum brace

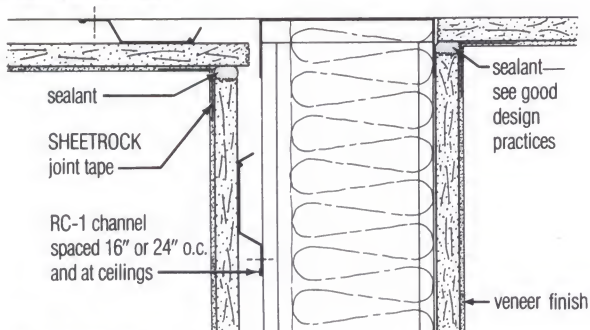


Steel stud brace

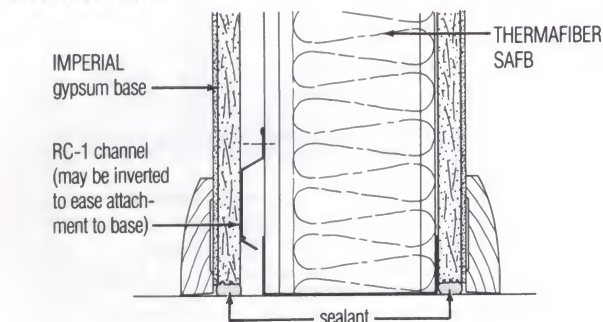


Steel stud & runner brace

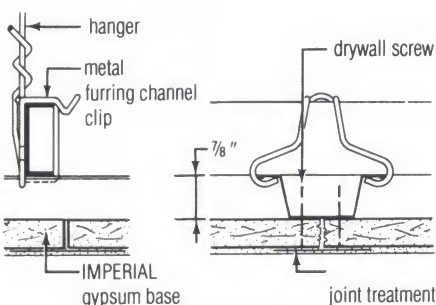
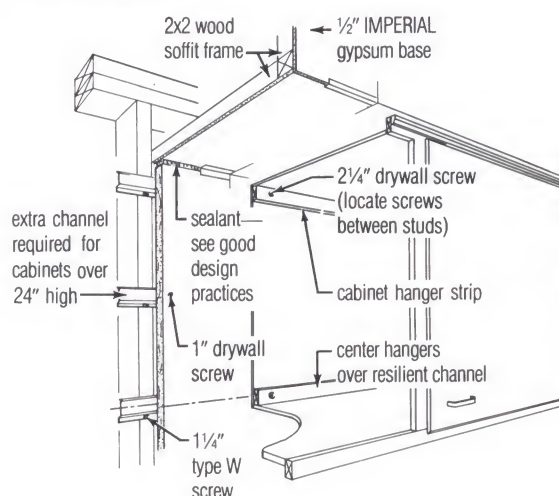
Ceiling attachment



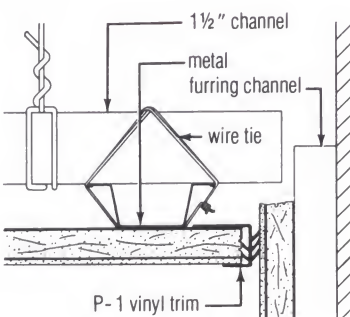
Floor attachment



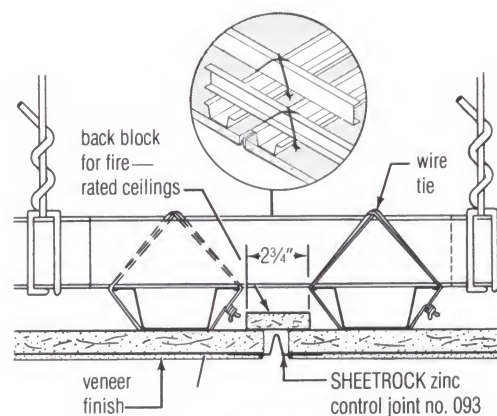
Cabinet attachment



Grillage suspension



Wall intersection



Control joint

Note:

Consult SA-923 Drywall/Steel Framed Systems for additional construction details to adapt for use with veneer plaster:

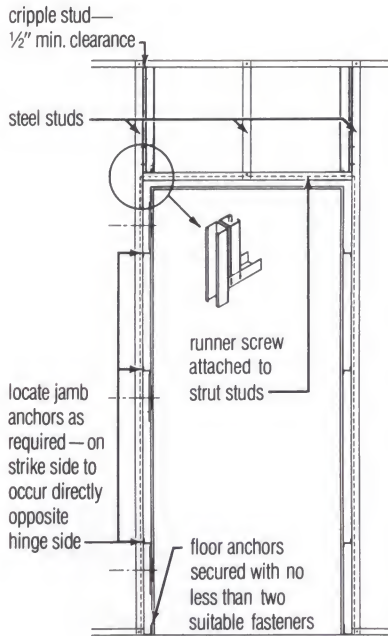
Interior Ceilings—Modify SA-923 details by including the proper frame spacing and IMPERIAL Gypsum Base thickness specified from table on page 11.

Column Fireproofing—Modify SA-923 details by including 1/2" IMPERIAL FIRECODE "C" Gypsum Base in UL Designs X521, X518, X515, X514 and X507.

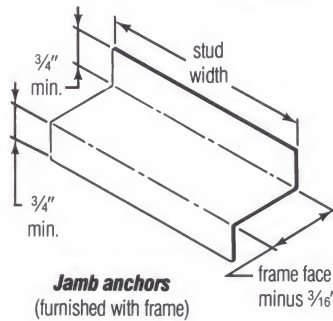
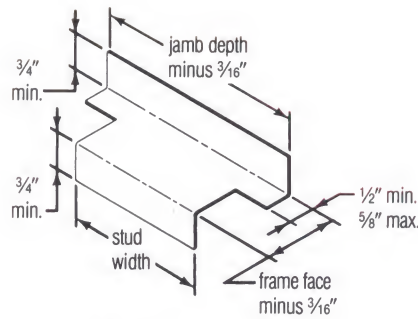
Beam Protection—Modify SA-923 by including 5/8" IMPERIAL FIRECODE Gypsum Base in UL Designs N501, N502 and N505.

scale: 3" = 1'-0"

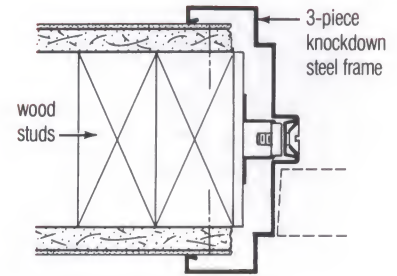
Steel door frame



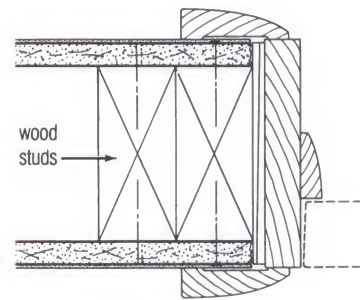
Elevation
cross section through frame



Jamb anchors
(furnished with frame)

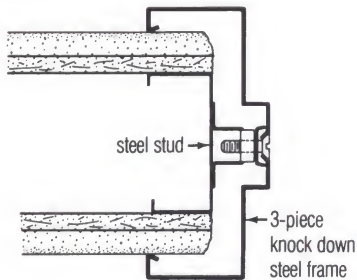


Steel door frame

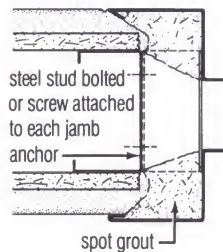


Wood door frame

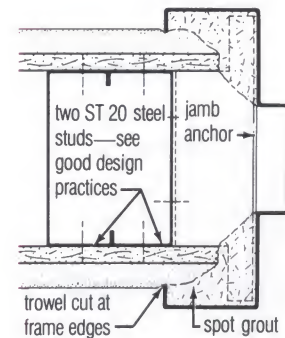
Door frames



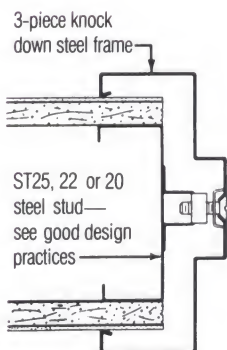
Jamb
standard door



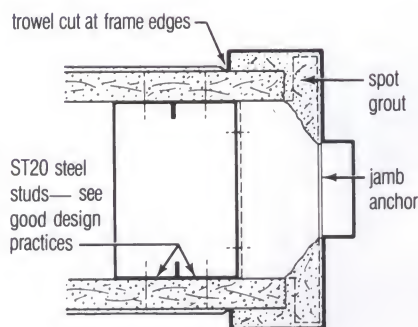
Jamb
standard door



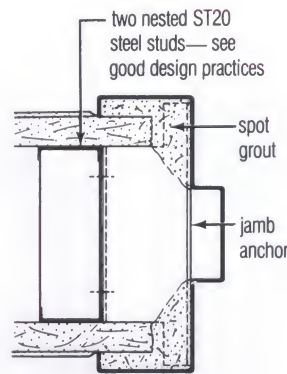
Jamb



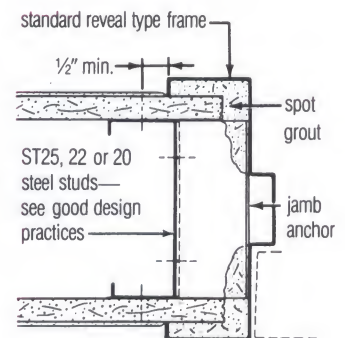
Jamb



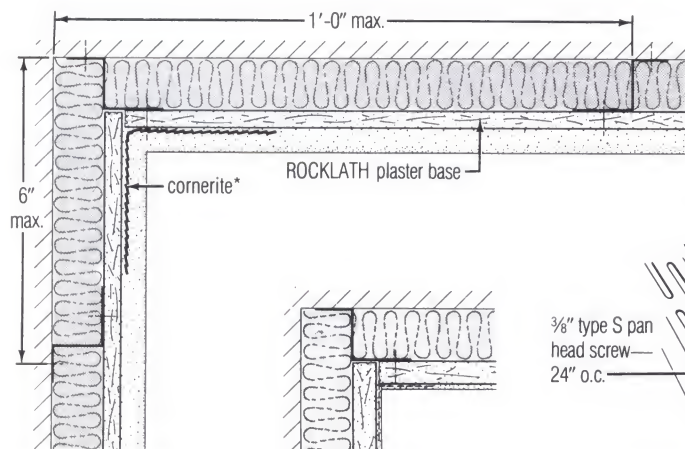
Jamb



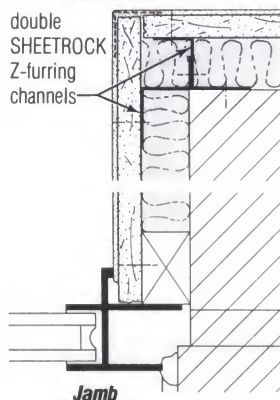
Alternate jamb



Jamb

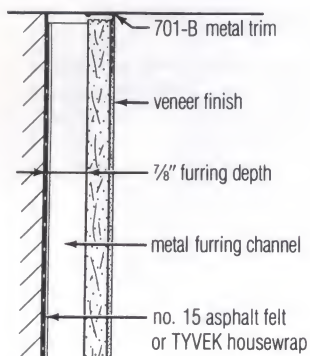


Interior corners

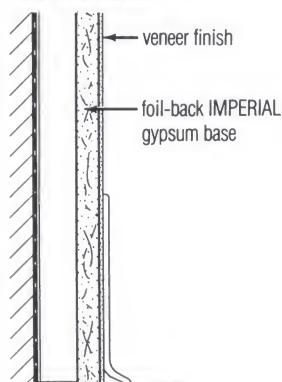


Jamb

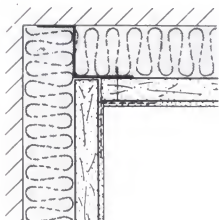
Ceiling attachment



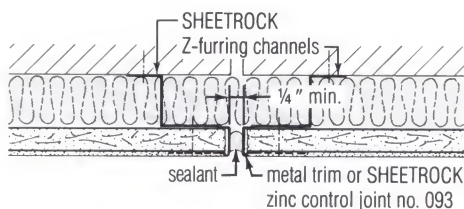
Floor attachment



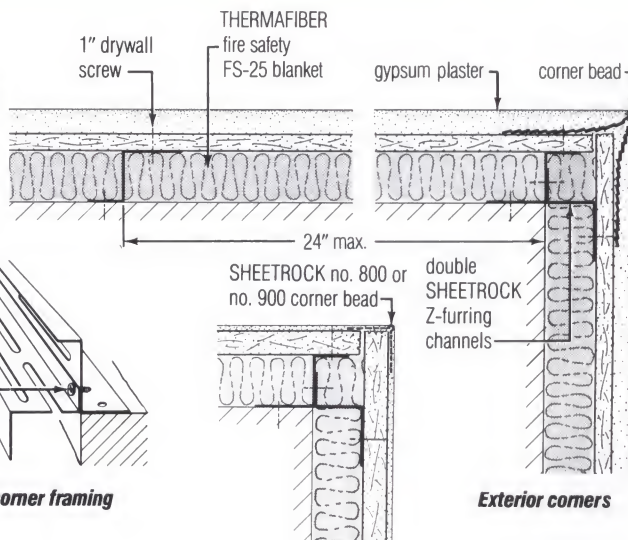
Direct furring



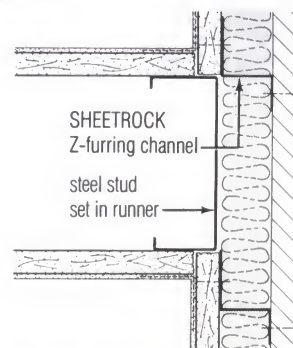
Exterior corner framing



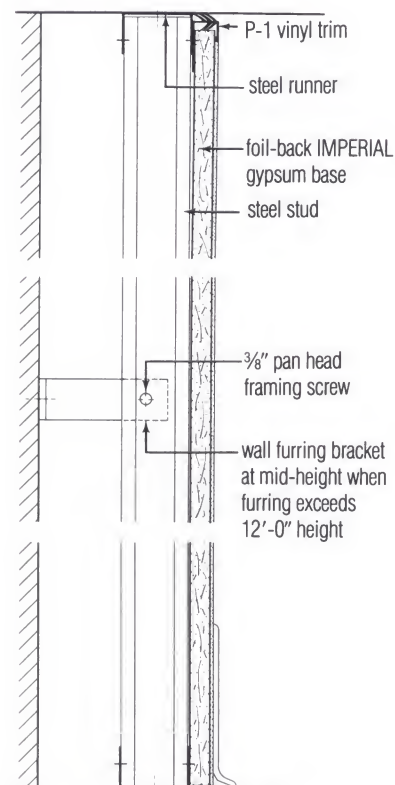
Wall control joint



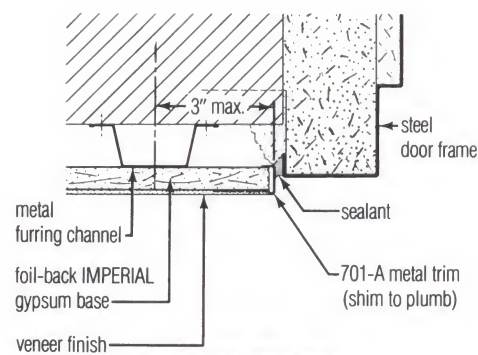
Exterior corners



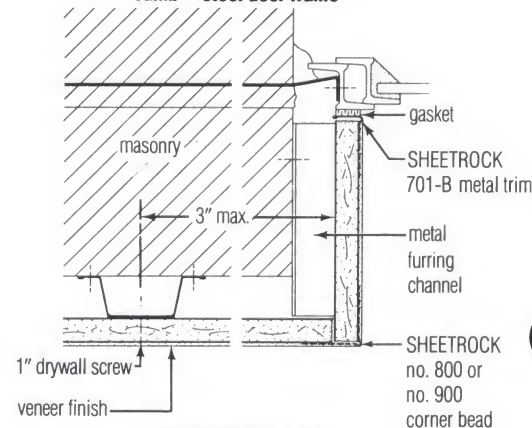
Partition wall intersection



Free-standing furring

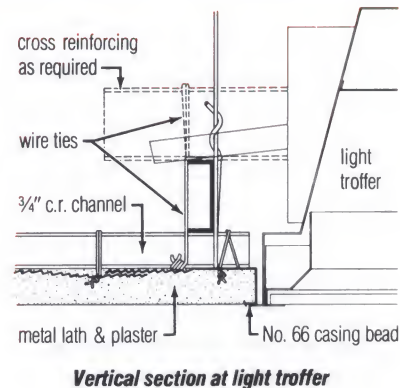
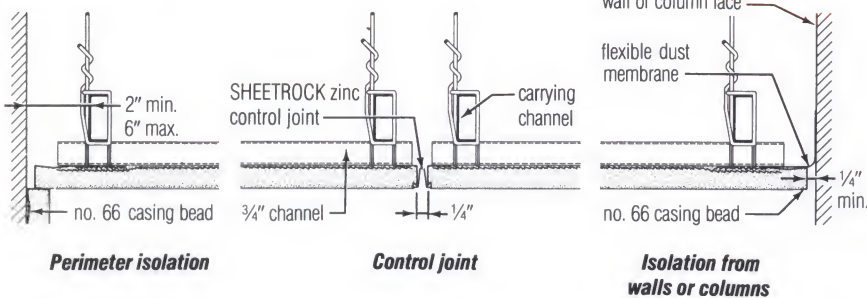


Jamb—steel door frame

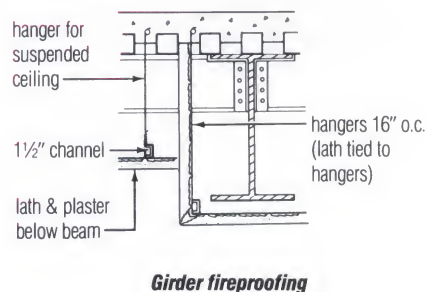
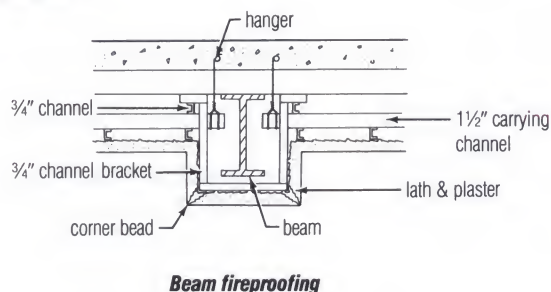
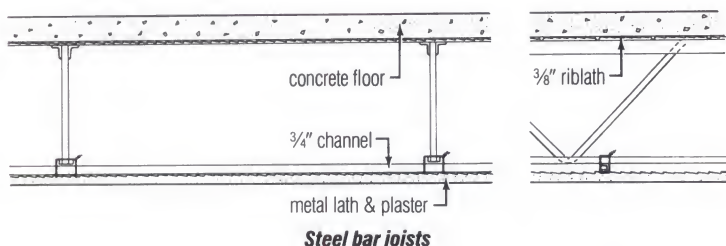


Metal window jamb

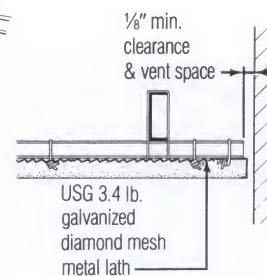
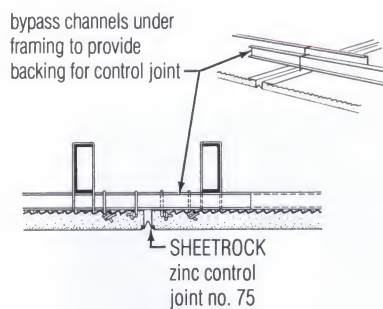
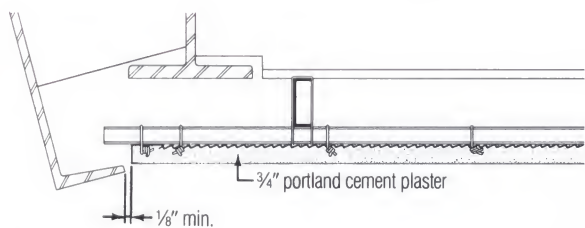
Suspended ceiling



Furred ceiling



Exterior soffit

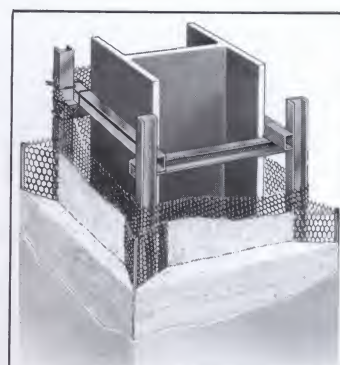
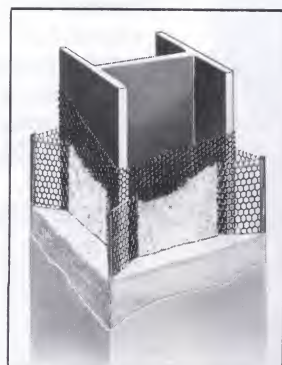
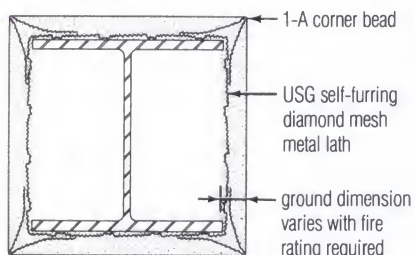


Perimeter relief

Control joint

Perimeter relief

Column fireproofing



1-2-3-4 hour column furring

3-hr. column

4-hr. column

General Lathing and Plastering Specifications

Good Design Practices

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.

2 Door and Borrowed-Light Openings—Steel door and borrowed-light frames should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall partition thickness. They should be anchored at floor with 16-ga. steel plates welded in trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in jamb. Stud reinforcing described below is screw-attached to jamb anchors. Three-piece frames may also be used with these partitions provided end of partition floor runner is anchored with two suitable fasteners.

For standard doors up to 3'0" wide weighing not more than 100 lb., ST25 steel studs and runners may be used for framing the opening. For doors 2'8" to 4'0" wide (200 lb. max.), rough framing should be ST20 studs (3 $\frac{5}{8}$ " min.) and runners. For heavy doors up to 4'0" wide (300 lb. max.), two ST20 studs should be used. For doors over 4'0" wide, double doors and extra-heavy doors (over 300 lb.), framing should be specially designed to meet load conditions. Rough framing for all doors in fire-rated partitions should be ST20 studs and runners.

For added door frame restraint, spot-grouting at the jamb anchor is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Grouting tube-type frames with plaster is not recommended. Apply SHEETROCK Setting-Type Joint Compound (DURABOND) just before inserting gypsum base into frame; do not terminate base against trim return. Finish should be grooved at frame.

3 Ceilings—Spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported. Lighting fixtures or troffers, air vents and other equipment should be separately supported from the ceiling grid or structure above; gypsum base will not support these items.

To prevent objectionable sag in new gypsum base ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for $\frac{1}{2}$ " thick base with frame spacing 24"o.c.; 2.2 psf for $\frac{1}{2}$ " base on 16"o.c. framing and $\frac{5}{8}$ " base on 24"o.c. framing. Foil-back base or a separate vapor retarder should be installed in all roofed ceilings if required by design, and the plenum or attic space vented with a min. $\frac{1}{2}$ -sq.in. net free vent area per sq.ft. of horizontal surface.

4 Control Joints—Gypsum base assemblies should be isolated with control joints or other means where: (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; (b) a ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief; (f) expansion or control joints occur in the base exterior wall.

Ceiling height door frames may be used as control joints. Less-than-ceiling height frames should have control joints extending to ceiling from both corners.

SHEETROCK Zinc Control Joints, when properly insulated and backed by gypsum board, have been fire-endurance tested and are certified for use in one- and two-hour fire rated walls.

5 Penetrations—Penetrations of the lath-and-plaster diaphragm such as borrowed lights, access panels and light troffers, require additional reinforcement at corners to distribute concentrated stress if a control joint is not used.

6 Plaster-metal Interface—Where a plaster surface is flush with metal, metal bucks, metal windows, or metal base, the plaster should be trowel-cut between the two materials.

7 Pipe and Conduit Chases—Additional chases can be provided in steel studs (except in fire-rated construction) by cutting round holes up to $\frac{3}{4}$ of stud width, spaced 12" apart.

8 Ceramic Tile—IMPERIAL Gypsum Base and ROCKLATH Plaster Base are not recommended as a base for the adhesive application of ceramic tile and plastic-faced panels. SHEETROCK brand Gypsum Panels, Water-Resistant, or DUROCK Interior Cement Boards are recommended for this use. Double-layer panels are required for resilient systems. Refer to separate United States Gypsum Company folders SA-919 Gypsum Products, Accessories & Systems and SA-932 DuRock Interior Cement Board in Sweet's General Building & Renovation file.

9 Furring Systems—Shallow electrical outlet boxes are recommended when rigid insulation less than 1 $\frac{1}{2}$ " thick is used.

10 Fixture Attachment—Lightweight fixtures and trim should be installed with toggle bolts or hollow wall anchors inserted in the base and, preferably, also through the stud. Wood or metal mounting strips for cabinets and shelving should be bolted to stud framing.

11 Zinc Alloy Accessories—Recommended where corrosion due to high humidity or saline content of aggregate is possible. Metal lath, control joints and other metal accessories, including zinc-alloy accessories, should not be used with magnesium oxychloride cement stuccos or portland cement stucco containing calcium chloride additives.

12 Joint Treatment—For steel frame systems SHEETROCK Setting-Type Joint Compound (DURABOND) and SHEETROCK Joint Tape must be used on all joints and internal corners and allowed to set and dry before veneer plaster application.



13 Decorating—All finishes applied over IMPERIAL Basecoat or DIAMOND Veneer Basecoat Plaster must be properly sealed before decorating. IMPERIAL Finish and DIAMOND Interior Finish, if sufficiently dry, may be painted the day after application with acrylic, latex or vinyl breather-type paints. Painting or further decoration of DIAMOND Interior Finish Plaster is recommended and should be specified. However, in many residential applications, DIAMOND Interior Finish Plaster provides a uniform white color and may satisfy a job's specific acceptance specifications when textured and left undecorated.

Gauged-lime putty and RED TOP Finish applied over conventional basecoat plasters must age 30 days, be thoroughly dry and properly sealed before decorating. Quick-drying vinyl acrylic latex or alkali-resistant alkyd primer-sealers are recommended. Do not specify polyvinyl acetate (PVA) primers for application to plaster finishes containing lime. In the presence of moisture, these primers can cause bond loss with resultant paint delamination and job failure.

14 Sound Control—Sound tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided. Where sound isolation is the primary consideration, only sand aggregated basecoat plasters should be used.

15 Shadowing and Spotting—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A** The interior facing of IMPERIAL brand Gypsum Base, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c.
- B** On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to interior side of wall and finish with IMPERIAL brand Gypsum Base, Foil-Back.
- C** For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.

16 High-Rise Buildings—Variable wind pressure can cause a structure to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause, or repair of these job-related noises.

17 Note—United States Gypsum Company reserves the right to make changes or improvements in the design of all catalogued items without notice and without obligation to incorporate these changes or improvements in items already manufactured.

18 Specifications—The following are minimum basic guides for preparation of job specifications. They are prepared for normal construction and are not intended to cover every possible design or job condition. Specific product data sheets are available from United States Gypsum Company for additional details and plaster

specifications. Requests for this data can be directed to the local sales offices identified on the last page of this brochure.

19 Additional Information—See technical folders in this series: Construction Selector SA-100 for fire and sound-rated systems; Drywall/Steel Framed Systems SA-923 for steel framing limiting heights tables and details; Texture and Finish Products Folder SA-933 for finishing product specifications; THERMAFIBER Life Safety Insulation Systems SA-707 for insulation specifications; Gypsum Panels & Accessories SA-927 for data on water-resistant gypsum panels; DUROCK Interior Cement Board SA-932 for data on ceramic tile base. Refer to UN-30 UNIMAST Steel Framing Systems: Technical Information for data on steel products.

Part 1: General

1.1 Scope—Specify areas to receive this treatment.

1.2 Qualifications

All materials described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed directions.

All metal lath and steel accessories identified as UNIMAST products in this catalog are exclusively marketed by United States Gypsum Company as integral components of our plaster systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials, except water and sand, shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

1.4.1 In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F (13°C) before gypsum base and lath installation. Temperature of building shall be maintained in uniform range above 55°F for an adequate period prior to application of plaster, while plastering is being done, and until plaster is dry. When required, heat shall be furnished by ().

Heat shall be well distributed in all areas, with deflection or protective screens used to prevent concentrated or irregular heat on plaster near source.

1.4.2 Ventilation and air circulation shall be kept to a minimum level during veneer plastering until the plaster has set and completely dried.

1.4.3 Ventilation shall be provided to properly dry conventional plaster during and subsequent to its application. In glazed buildings, this shall be accomplished by keeping windows open sufficiently to provide air circulation; in enclosed areas lacking normal ventilation, provisions must be made to mechanically remove moisture-laden air.

1.4.4 If glazed sash are not in place and the building is subject to hot, dry winds or temperature differentials from day to night of 20°F (11°C) or more, openings shall be screened with cheesecloth or similar material.

1.5 Protection

Proper protection shall be provided during plastering for finished door and window frames and other designated areas which do not receive a plaster finish.

Part 2: Products

2.1 Framing & Furring Accessories

- A UNIMAST Steel Studs:** 158ST25 (1½"), 212ST25 (2½"), 358ST25 (3½"), 400ST25 (4"), 600ST25 (6"), 212ST22 (2½"), 358ST22 (3½"), 400ST22 (4"), 600ST22 (6"), 212ST20 (2½"), 358ST20 (3½"), 400ST20 (4"), 600ST20 (6"), 362SJ20 (3½"), 40SJ20 (4").
- B UNIMAST Steel Runners:** 158CR25 (1½"), 212CR25 (2½"), 358CR25 (3½"), 400CR25 (4"), 600CR25 (6"), 212CR22 (2½"), 358CR22 (3½"), 400CR22 (4"), 600CR22 (6"), 212CR20 (2½"), 358CR20 (3½"), 400CR20 (4"), 600CR20 (6"), 362CR20 (3½"), 40CR20 (4").
- C Lathing Channels:** UNIMAST Cold-Rolled Channels (¾", 1½", 2") (pdt, galv).
- D Furring Channels:** UNIMAST Metal Furring Channels (DWC-25) (DWC-20) SHEETROCK Z-Furring Channels (1", 1½", 2", 3").
- E Resilient Channels:** RC-1™ Resilient Channel.
- F Metal Angles:** UNIMAST Galvanized Metal Angles (1½" x 7⁄8") (2½" x 2½").

2.2 Veneer Plaster Base

- A IMPERIAL Gypsum Base:** (½") (5⁄8") thick, 48" wide, square edge, (Regular) (FIRECODE) (FIRECODE C) (Foil-Back).
Note: Specify only with veneer plaster, SHEETROCK No. 800 or No. 900 Corner Bead and IMPERIAL Joint Reinforcement Tape or SHEETROCK Joint Tape and SHEETROCK Setting-Type Joint Compound (DURABOND).

2.3 Lathing Materials

- A ROCKLATH Plaster Base:** (¾" or ½" x 16" x 48") (¾" x 16" x 96").
- B UNIMAST Metal Lath:** Junior Diamond Mesh Lath (1.75, 2.5, 3.4) lb., (pdt, galv); Self-Furring DIAMOND Mesh Lath (2.5, 3.4) lb., (pdt, galv), (Paper-Backed—Grade B or Grade D), 4-Mesh Z-Riblath (2.75, 3.4) lb., (pdt, galv), ¾" Riblath (3.4) lb., (pdt, galv).

2.4 Insulation

- A THERMAFIBER Sound Attenuation Fire Blankets** (1", 1½", 2", 2½", 3") x (16", 24").

2.5 Plastering and Trim Accessories—Veneer Plaster

- A Screws:**
size: (¾") (7⁄16") (½") (1") (1¼") (1½") (1⅝") (2") (2¼") (2½") (3")
style: (framing—Type S or S-12) (drywall—Type S) (self-drilling—Type S-12) (laminating—Type G) (coarse thread—Type W)
head: (bugle) (pan) (trim) (pancake) (low-profile) (mod. truss head)
coating: (reg) (corrosion-resistant)
- B Corner Bead:** SHEETROCK No. 800 (for drywall and one-coat veneer plaster) SHEETROCK No. 900 (for two-coat veneer plaster) SHEETROCK 4-A Flexible Corner Bead (for archways and curved designs).
- C Trim:** SHEETROCK No. 701-A (J-Type) No. 701-B (L-Type) (for two-coat veneer plaster) SHEETROCK No. 801-A, No. 801-B (for one-coat veneer plaster).
- D Zinc Control Joint:** SHEETROCK No. 093 Control Joint.
- E Joint Reinforcement:** SHEETROCK Joint Tape, SHEETROCK Setting-Type Joint Compound—DURABOND (for use over steel framing and when rapid drying conditions exist) _____ Veneer Plaster (specify from page 3) and IMPERIAL Tape (Type P, Type S) (to embed tape over wood framing).
- F Clip:** UNIMAST Metal Furring Channel Clip.
- G Furring Brackets:** UNIMAST Adjustable Wall Furring Brackets.
- H Wire:** UNIMAST Hanger Wire (8-ga.) UNIMAST Tie Wire (18-ga.).
- I Caulking:** SHEETROCK Acoustical Sealant.
- J Laminating Adhesive:** SHEETROCK Setting-Type Joint Compound (DURABOND).

2.6 Lathing Accessories—Conventional Plaster

- A Screws:** select from section 2.5 paragraph A.
- B Corner Bead:** UNIMAST 1-A Expanded, UNIMAST Double-X.
- C Casing Beads:** UNIMAST Casing Bead #66 Expanded Flange (¼", ⅜", ½", ⅝", ¾", 1", 1¼") (galv, zinc), UNIMAST Casing Bead #66 Short Flange (¼", ⅜", ½", ¾", ⅞") (galv, zinc).
- D Zinc Control Joint:** SHEETROCK Zinc Control Joint (#50, #75, #100) (zinc), UNIMAST Double-V Expansion Joint (½", ¾") (galv, zinc).
- E Reinforcement:** UNIMAST Cornerite, UNIMAST Striplath.
- F Lath Attachment Clip:** BRIDJOINT B-1 Field Clip.
- G Wire:** UNIMAST Hanger Wire (8-ga.), UNIMAST Tie Wire (18-ga.).

2.7 Plastering Material

- A Veneer Plaster Basecoat:** IMPERIAL Basecoat, DIAMOND Veneer Basecoat Plaster.
- B Basecoat Plaster—Conventional:** RED TOP Gypsum Plaster, RED TOP Wood Fiber Plaster, RED TOP Two-Purpose Plaster, STRUCTO-BASE Gypsum Plaster, STRUCTO-LITE Gypsum Plaster.
- C Aggregate:** sand, perlite (meeting ASTM C35) sand for float finishes shall be graded (white) silica sand passing a (30 mesh) (20 mesh) screen.
- D Veneer Plaster—Prepared Finish:** IMPERIAL Finish Plaster, DIAMOND Interior Finish, RED TOP Finish.
- E Finish Lime:** IVORY, SNOWDRIFT (type S) RED TOP, GRAND PRIZE (type N).
- F Gauging Plaster:** RED TOP Gauging, CHAMPION Gauging (white), STAR Gauging (white), STRUCTO-GAUGE Gauging, RED TOP Keenes Cement.
- G Exterior Stucco Finish:** ORIENTAL Exterior Stucco Finish (white) (pre-mixed colors available in some regions—contact United States Gypsum Company for availability).
- H Grout:** STRUCTO-LITE Gypsum Plaster, RED TOP Gypsum Plaster.
- I Water:** potable without impurities that affect the setting of gypsum.
- J Special Plasters:** USG Molding Plaster, White HYDROCAL Gypsum Cement, HYDROCAL FGR Gypsum Cement.

2.8 Mixes

- A Veneer Plaster Basecoat:** _____ shall be mixed in accordance with water proportions identified on bag. Mix for 2 to 5 minutes with a cage-type paddle mixer using a 900-1000 rpm ½" drill.
- B Veneer Plaster—Prepared Finish:** Add all but 1 to 2 quarts of the required water to a non-plastic mixing container. Mix for 1 to 2 minutes, add up to 1 to 2 quarts of retained water and then mix for 1 to 2 minutes more. Mix with a cage-type paddle mixer using a 900-1000 rpm ½" drill.
- C Basecoat Plaster—Conventional:** Basecoat plaster and aggregate shall be mixed in proportions of _____ (specify from technical data, page 4).
- D IVORY or SNOWDRIFT Lime:** Shall be machine-mixed for immediate use with approx. 5½ to 6 gal. water per 50-lb. bag.
- E GRAND PRIZE or RED TOP Lime:** Shall be box-soaked or machine-mixed using approx. 6 gal. water per 50-lb. bag, and allowed to soak for 16 hours.
- F Finish Plaster:** Shall be mixed in proportion by dry weight of _____ parts of gauging to _____ parts of lime (specify from application data, page 5), according to applicable bag directions. Over lightweight aggregate basecoats (such as STRUCTO-LITE Gypsum Plaster) add ½ cu. ft. of perlite fines or 50 lb. of No. 1 silica sand per 100 lb. of gauging plaster or use mill-aggregated "quality" gauging plaster.

2.9 STRUCTOCORE Security Wall System

(See product descriptions, technical data and specifications in SA-1119).

Part 3: Execution

3.1 Steel Framing and Furring Installation

3.1.1 Partition Framing Erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle or hollow wall anchors spaced 16" o.c.

Position steel studs vertically, engaging both floor and ceiling runners, and spaced max. (16")(24") o.c. When necessary, splice studs with 8" nested lap and one positive attachment per stud flange. Place studs in direct contact with door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are attached to exterior walls and possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with metal lock fastener tool or screws. Securely anchor studs to jamb and head anchors of door or borrowed-light frames by bolt or screw attachment (not required for frames with structural bar struts). Over steel door and borrowed-light frames, place a cut-to-length section of runner, with a web-flange bend at each end, horizontally and secure to strut-studs with two screws in each bent web. Position a cut-to-length stud (extending to ceiling runner) at vertical plaster base joints over door header.

3.1.2 Chase Wall Framing Erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power-driven anchors 24" o.c., to suspended ceilings with toggle bolts or hollow wall anchors 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position steel studs vertically in runners, (16")(24") o.c., with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs adjacent to door and window frames, partition intersections and corners to floor and ceiling runner flanges with metal lock fastener tool or screws.

Cut cross bracing made from gypsum base 12" high by wall width. Place between rows of studs. Space braces 48" o.c. vertically and attach to stud webs with six Type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side. Attach single-layer or base-layer gypsum base with (1") Type S screws spaced 12" o.c. in field and 8" o.c. staggered at joints.

Bracing of 2½" steel studs may be used in place of gypsum braces. Anchor web at each end of steel brace with two pan head framing screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2½" runner screw-attached to chase wall studs within the cavity.

3.1.3 Ceiling Grillage Erection

Space 8-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install 1½" carrying channels 48" o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 18-ga. tie wire.

Erect metal furring channels at right angles to 1½" carrying channels or main support members. Space furring (16")(24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and

abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 18-ga. tie wire. At splices, nest furring channels at least 8" and wire-tie each end with double-strand 18-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.1.4 RC-1™ Resilient Channel Erection

Position resilient channel at right angle to steel studs, space 24" o.c. and attach to steel stud flanges with pan head framing screws driven through holes in channel mounting flange and to wood framing with 1¼" SUPERTITE Wood Screws or Buildex Type W. Install channel with mounting flange down, except at floor to accommodate attachment. Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Cantilever channel ends no more than 6". Splice channel by nesting directly over framing member. Reinforce with screws located at both ends of splice. Use of a filler strip at the base may reduce STC rating.

Where cabinets will be installed, attach resilient channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at midpoint between hangers.

3.1.5 Z-Furring Channel Erection

Erect insulation vertically and hold in place with SHEETROCK Z-Furring Channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner. On adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with a standard width insulation panel and continue in regular manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold mineral-fiber insulation in place until gypsum base is installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment of fixtures and furnishings.

3.1.6 Wall Furring Channel Attachment—Direct

Attach metal furring channels vertically, spaced (16")(24") o.c., to interior of masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24" o.c. on opposite flanges. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.



3.2 Sound Attenuation Fire Blanket Installation

3.2.1 Install THERMAFIBER SAFB after gypsum base is applied directly to the face of the studs on one side of the partition. Insert the 25" wide blanket in the stud cavity by bowing the blanket slightly. After inserting, make a vertical cut in the blanket (about 1" deep) on a centerline between the studs. Butt ends of blankets closely together and fill all voids. Apply gypsum base directly to studs or to RC-1 Resilient Channels on the opposite side of the partition.

3.3 Veneer Plaster Base Installation

3.3.1 Ceiling Installation

Apply gypsum base of maximum practical length wherever possible on ceilings first with long dimension perpendicular to furring channels with blue face paper down. Position end joints over framing and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten base to channels with 1" Type S screws spaced 12" o.c. in field of base and along abutting ends and edges.

For single-layer Resilient Ceiling System, apply IMPERIAL Gypsum Base, ceiling first, with long dimension at right angles to channels, and end joints neatly fitted and centered over channel attachment flange. Attach with 1" Type S screws spaced 12" o.c. across each channel and perimeter screws not less than $\frac{3}{8}$ " from ends and edges. Support gypsum base around all cutouts and openings.

For double-layer Resilient Ceiling System, apply base layer with long edges across joists and end joints staggered. Fasten base to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with $1\frac{1}{8}$ " Type S screws. Install face layer with long dimension across channels; use 1" Type S screws spaced 12" o.c.

3.3.2 Single Layer Gypsum Base Erection

Apply gypsum base (parallel to studs) (perpendicular to studs). Position all edges over stud flanges for parallel application; all ends over stud flanges for perpendicular application. To maintain a true surface plane, arrange direction of application so leading edge of base is attached first to open edge of stud flange. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition placed on different studs.

Fasten base to stud framing with screws spaced 12" o.c. in field of base and along abutting end joints. Screw spacing shown is for non-rated construction. For fire-rated construction, obtain screw spacing from test report.

Drive fasteners in field of base in wood framing first, working towards ends and edges. Hold base in firm contact with framing while driving fasteners. Space nails 7" o.c. on ceilings, 8" o.c. on walls, screws 12" o.c. and perimeter fasteners not less than $\frac{3}{8}$ " from ends or edges. Drive fastener heads flush with surface of base, not dimpled, and without breaking paper. Wherever base is not tight against framing, drive another fastener within $1\frac{1}{2}$ " of first fastener. Float gypsum base at vertical interior angles by attaching the overlapping sheet of base only, at the angle; at horizontal interior angles by attaching both sheets of base no closer than 8" from the angle.

3.3.3 Double Layer Gypsum Base Erection

For screw attachment, space screws 24" o.c. for base layer and 12" o.c. for face layer. Apply both layers of gypsum base parallel to studs with joints in face layer offset from base layer joints. For $\frac{1}{2}$ " or $\frac{5}{8}$ " base, use 1" screws for base layer and $1\frac{1}{8}$ " screws for face layer.

In double-layer laminated construction, attach base layer with 1" Type S screws spaced 12" o.c. in field of base and along abutting ends and edges. Apply face layer parallel to studs with specified SHEETROCK Setting-Type Joint Compound (DURABOND) or SHEETROCK Ready-Mixed Joint Compound spread on back side, joints staggered

approx. 12" and fastened to base layer with $1\frac{1}{2}$ " Type G screws. Drive screws approximately 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 3" from vertical edges. Screw spacing shown is for non-rated construction. For fire-rated construction, obtain screw spacing from test report.

3.4 Gypsum Plaster Lath Installation

3.4.1 Plaster Base Installation

Apply $\frac{3}{8}$ " ROCKLATH Plaster Base, bottom course first, with face out, long dimension at right angles to studs and joints butted together. Cut lath to fit neatly round electrical outlets, openings, etc. Place end joints between studs, staggered in successive courses. Align and support lath ends with BRIDJOINT B-1 Clips at top, center and bottom of each butt joint. Secure lath to studs using two 1" Type S screws per stud, each located 2" from lath edge. Fasten to framing members that have not been installed with BRIDJOINT B-1 Clips according to frame and fastener spacing table on p. 8.

3.5 Accessory Application

3.5.1 Corner Bead—Attach to all vertical and horizontal exterior corners with nails, screws or $\frac{1}{16}$ " galvanized staples spaced 12" o.c. along both flanges along entire length of board.

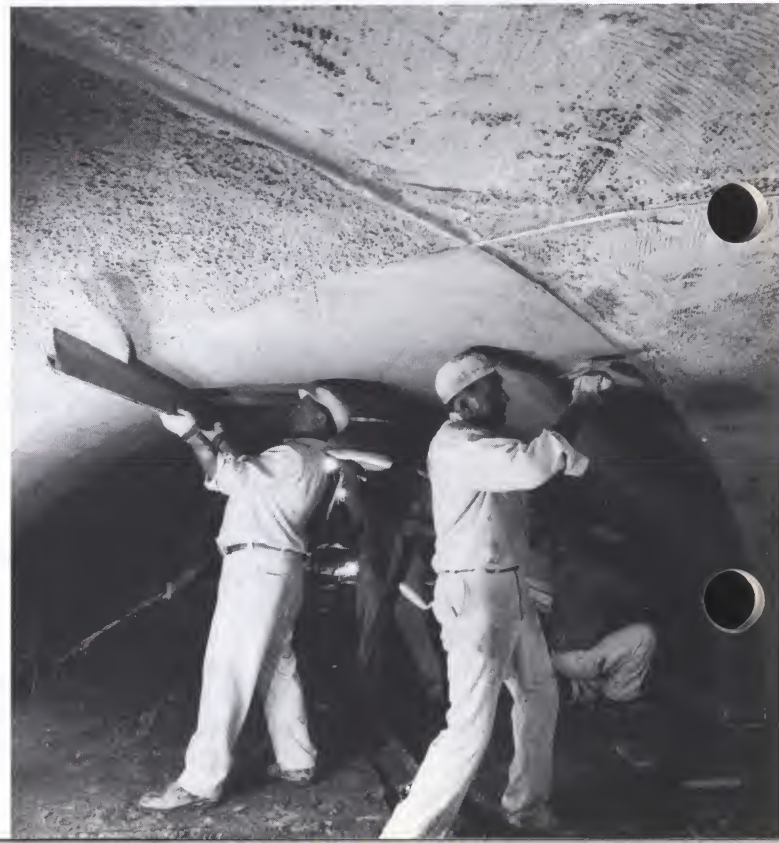
3.5.2 Control Joints—Install where indicated on plans. Break base behind joint and back by double studs. Apply acoustical sealant to fill gap and attach joint to gypsum base with nails, screws or $\frac{1}{16}$ " galvanized staples spaced 6" o.c. on both flanges along joint length.

3.5.3 Casing Beads and Metal Trim—Apply to IMPERIAL Gypsum Base or ROCKLATH Plaster Base with fasteners or $\frac{1}{16}$ " galvanized staples 12" o.c. or wire-tie and fasten to metal lath. Cut and miter ends accurately and install where partitions or ceilings terminate against masonry, dissimilar material and where indicated.

3.5.4 Reinforcing—Install self-furring UNIMAST Diamond Mesh Lath or UNIMAST Cornerite over joints between dissimilar conventional plaster bases. Reinforce openings with UNIMAST Striplath stapled diagonally across corners. Install striplath in interior plaster angles.

3.5.5 Vinyl Trim—Slip P-1 vinyl trim over base with long flange behind base. Install base with trim firmly abutting surface.

3.5.6 Screws—Power-drive and set flush with surface of IMPERIAL Gypsum Base without tearing through the paper.



3.5.7 Laminating Adhesive—For laminating double layers of IMPERIAL Gypsum Base, spread to provide full $\frac{1}{2}$ " adhesive beads $\frac{1}{2}$ " o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four $\frac{1}{2}$ " beads to 2" o.c. Space strips 24" o.c.

3.5.8 Joint System—Use SHEETROCK Setting-Type Joint Compound (DURABOND) and SHEETROCK Joint Tape system when IMPERIAL Gypsum Base is applied to steel framing and when rapid drying, low humidity or high temperatures exist. Use on all joints, internal corners, trim and corner beads and allow to set and dry before plaster application.

Over wood framing, firmly embed IMPERIAL Type P Tape to insure wrinkle-free attachment or use $\frac{3}{8}$ " staples to apply IMPERIAL Type S Tape. Use two staples at each end of tape and stagger intermediate staples 24" o.c. along length of tape. At intersections and corners staple 24" o.c. on one edge only. Do not overlap tape at intersections and apply over full length of gypsum base.

3.6 Column Fireproofing Installation

3.6.1 UL Design X518-2 hr.

Attach inner layer $\frac{1}{2}$ " IMPERIAL FIRECODE C Gypsum Base to $\frac{1}{8}$ " steel studs with 1" Type S screws spaced 24" o.c. and place assembly with gypsum base next to column flange. Install gypsum base layer vertically around column using 1" Type S screws to attach base layer to stud web 24" o.c. and face layer to stud flange 12" o.c. Apply face layer vertically over web face side of column and fasten through base layer to web of studs with $\frac{1}{8}$ " Type S screws spaced 12" o.c. and staggered from screws in base layer. Apply corner bead at all corners and $\frac{1}{16}$ " veneer finish.

3.6.2 UL Designs X521-2 hr. & X514-3 hr.

For all W14 x 228 steel columns, provide fire protection with $\frac{1}{2}$ " IMPERIAL FIRECODE C Gypsum Base applied vertically over $\frac{1}{8}$ " steel studs positioned at corners. Attach base to studs with 1" Type S screws spaced 12" o.c. For 3-hour rating install additional layer over web surface and attach to studs with $\frac{1}{8}$ " Type S screws spaced 12" o.c. Apply corner bead at all corners and $\frac{1}{16}$ " veneer finish.

3.6.3 UL Design X515-3 hr.

Attach inner layer $\frac{1}{2}$ " IMPERIAL FIRECODE C Gypsum Base to $\frac{1}{8}$ " steel studs with 1" Type S screws spaced 12" o.c. and place assembly with gypsum base next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten base layers with 1" Type S screws, middle layers with $\frac{1}{8}$ " screws and face layers with $\frac{3}{4}$ " screws. Space all screws 12" o.c. vertically. Apply corner bead at corners and $\frac{1}{16}$ " veneer finish.

3.6.4 UL Design X507-4 hr.

For all W14 x 228 steel columns, provide fire protection with double-layer $\frac{1}{2}$ " IMPERIAL FIRECODE C Gypsum Base applied vertically over $\frac{1}{8}$ " steel studs positioned at corners. Attach base layer to studs with 1" Type S screws spaced 12" o.c. and attach face layer with $\frac{1}{8}$ " Type S screws spaced 12" o.c. and staggered 6" from base layer screws. Apply corner bead at corners and $\frac{1}{16}$ " veneer finish.

3.6.5 UL Design X524-2 hr.

Provide fire protection to all columns with three layers $\frac{1}{2}$ " IMPERIAL FIRECODE C Gypsum Base screw-attached to $\frac{1}{8}$ " steel studs positioned at column corners. Cut studs $\frac{1}{2}$ " to $\frac{3}{4}$ " less than column height. For columns having depth of 36" or less, apply panels vertically and stagger joints between layers at least 30".

When column depth exceeds 36", install additional $\frac{1}{8}$ " studs in each web recess inside and along column flanges and at the web center. Set studs in runners placed horizontally, parallel to web between column flanges and spaced max. 8' o.c. vertically. Fasten studs to runners at top and bottom with $\frac{1}{2}$ " Type S-12 pan head screws. Apply gypsum base horizontally and stagger joints between layers at least 12".

3.7 Caged Beam Fireproofing

Position ceiling runners at least $\frac{1}{2}$ " from and parallel to beam, and fasten to floor units with $\frac{1}{2}$ " Type S-12 pan head screws spaced 12" o.c. Fabricate hanger brackets from $\frac{1}{8}$ " steel runners allowing 1" clearance at bottom of beam. Space brackets 24" o.c. along beam and attach to ceiling runners with $\frac{1}{2}$ " Type S-12 screws. Install lower corner runners parallel to beam and fasten to brackets with $\frac{1}{2}$ " Type S-12 screws.

Screw-attach (two) (three) layers of $\frac{5}{8}$ " IMPERIAL FIRECODE Gypsum Base to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in each layer. Attach panels to channel brackets with (1") ($\frac{1}{4}$ ") Type S screws 16" o.c. for base layer, $\frac{1}{8}$ " Type S screws 12" o.c. for middle layer and ($\frac{1}{8}$ ") ($\frac{1}{4}$ ") Type S screws 8" o.c. for face layer. For 3-hour assembly, install wire mesh over bottom middle-layer panel, extend $1\frac{1}{2}$ " up each side and fasten with $\frac{1}{8}$ " screws used to fasten panels.

3.8 Control Joint Installation

Where indicated on drawings, attach SHEETROCK Zinc Control Joints (size) with drywall screws or Bostitch $\frac{9}{16}$ " "G" staples spaced not over 6" apart in each flange. (Control joint Nos. 50, 75, 100—splice ends together with 16-ga. tie wire inserted into openings in the key-lock sections.) (Control joint No. 093—square-cut end joints, butt together and align for neat fit.) Remove protective tape after plastering.

3.8.1 Interior Ceilings—space control joints not exceeding () ft. in either direction (see Good Design Practices #4). Break lath behind control joints; where channel framing is used, also break the channels. Position control joints to intersect light fixtures, heating vents, air diffusers, etc.

3.8.2 Interior Walls and Partitions—space control joints maximum of 30' apart; control joints may occur over door frames as indicated in drawings.

3.8.3 Exterior Walls, Soffits and Canopies of Portland Cement Stucco—space control joints not exceeding 10' in either direction. Where there is an intersection of vertical and horizontal joints, use continuous vertical joint and butt the horizontal joint. Caulk splices and intersections exposed to the elements with a silicone rubber caulking cement. In soffits and canopies, break lath and channel behind control joints.

3.9 IMPERIAL Basecoat and DIAMOND Veneer Basecoat Plasters

3.9.1 Gypsum Base: When applied directly to IMPERIAL Gypsum Base, embed tape and fill beads, and allow plaster to set; then scratch and immediately double back to a thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ ", in accordance with manufacturer's directions.

3.9.2 Concrete Block: When applied directly over unglazed concrete block, fill all voids and depressions including joints; leave rough and allow to set prior to lime putty finish application. Spray concrete block uniformly with water immediately before applying basecoat. RED TOP Accelerator may be used to quicken set. Total basecoat shall be $\frac{1}{16}$ " to $\frac{3}{32}$ " thick.

3.9.3 Monolithic Concrete: When applied to monolithic concrete to which a plaster bonding agent is to be applied, surface shall be free of dirt, dust, grease, wax, oil or other unsound surface conditions. Laitance, efflorescence and parting compounds shall be chemically removed. Apply plaster bonding agent to concrete surface in a continuous film according to manufacturer's directions. Apply basecoat plaster by firmly grinding a thin coat into the bonding agent. Immediately double back to a completed thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ " having a level surface ready for finish plaster application.

3.9.4 Metal Sections: Where plaster is flush with metal base, metal

3.10 Plaster Thicknesses

Shall be as shown on plans; however, in no case shall the grounds be less than:

Metal lath— $\frac{5}{8}$ " (from face of lath)

ROCKLATH Plaster Base— $\frac{1}{2}$ "

Masonry units— $\frac{5}{8}$ " conventional; up to $\frac{3}{16}$ " for two-coat veneer applications

Monolithic concrete ceilings— $\frac{1}{8}$ " ($\frac{3}{8}$ " maximum)

Monolithic concrete walls— $\frac{1}{8}$ " ($\frac{5}{8}$ " maximum)

IMPERIAL Plasters— $\frac{1}{16}$ " to $\frac{3}{32}$ " (over special gypsum base)

DIAMOND Interior Finish (for electrical cable ceilings)— $\frac{3}{8}$ " (over gypsum base or monolithic concrete).

3.11 Basecoat Plaster—Conventional

Basecoat application: Mix basecoat plasters by hand or in a mechanical mixer to a uniform consistency following manufacturer's directions. Apply basecoat plaster by (hand) (machine) in (1) (2) coats. Monolithic or unit masonry surfaces that exhibit high suction shall be moderately wetted immediately before plastering.

A Two-coat work: Over gypsum lath and masonry, apply base (first) coat with sufficient material and pressure to form good bond to base and to cover well, and then double back to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water and leave rough to receive finish (second) coat.

B Three-coat work: Apply scratch (first) coat with sufficient material and pressure to form good full keys on metal lath, and good bond on other bases, and then cross-rake. Apply brown (second) coat after scratch (first) coat has set firm and hard. Bring out to grounds and straighten to a true surface with rod and darby without use of additional water. Leave rough to receive finish (third) coat.

3.12 Special Applications

3.12.1 Solid Studless Metal Lath Partition: Apply scratch coat to side opposite bracing, and allow to set and partially dry. Then apply brown coat to side opposite braces, allowing it to set thoroughly before removing temporary braces. Next apply brown coat to previously braced side to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water, and leave surface rough to receive finish coat.

3.12.2 Solid Channel Stud Metal Lath Partition: Apply scratch coat to lath side and allow to set and partially dry. Then apply back-up coat to channel side to full grounds, $\frac{1}{2}$ " over channels, in not less than two operations; allow to set. Apply brown coat on lath side to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water, and leave surface rough to receive finish coat.

3.12.3 Portland Cement Basecoats shall be proportioned (specify from page 6), and applied in two coats. After setting, rake scratch coat perpendicular to framing and damp-cure for not less than 48 hours. Damp-cure brown coat after setting for not less than 48 hours.

3.12.4 Grout all steel door frames in solid plaster and steel stud partitions prior to lathing.

3.13 Veneer Plaster Finish Applications

3.13.1 DIAMOND Interior Finish: Over IMPERIAL Gypsum Bases embed tape, fill beads and allow to set; then apply a thin, tight scratch coat over entire working area. Immediately double back with material from same batch to a nom. $\frac{1}{16}$ " to $\frac{3}{32}$ " thickness. Over DIAMOND Veneer Basecoat Plaster, scratch and immediately double back to $\frac{1}{16}$ " to $\frac{3}{32}$ " thickness. Over monolithic concrete, apply a plaster bonding agent; then scratch and double back with a job-aggregated plaster to a $\frac{3}{32}$ " thickness.

3.13.2 DIAMOND Interior Finish (for electrical cable ceilings): Over monolithic concrete ceilings, prepare the surface with plaster bonding agent in a continuous film. Apply job-sanded DIAMOND Interior Finish to a total thickness of $\frac{3}{8}$ "—consisting of a $\frac{5}{16}$ " fill coat to completely cover cable and anchoring devices, and $\frac{1}{16}$ " finish coat.

3.13.3 IMPERIAL Finish: Over IMPERIAL Gypsum Base embed tape, fill beads and allow to set; then scratch and immediately double back to a thickness of from $\frac{1}{16}$ " to $\frac{3}{32}$ ", in accordance with manufacturer's directions. Over IMPERIAL Basecoat, scratch and immediately double back to $\frac{1}{16}$ " thickness.

3.14 Finish Coat Plaster Applications—Conventional and Other

A Trowel Finish Coats: Scratch plaster in thoroughly and immediately double back to fill out to a smooth, dense surface for decoration, free of surface blemishes and irregularities. Apply finish coat as thin as possible, preferably $\frac{1}{16}$ " to not more than $\frac{1}{8}$ " maximum thickness. Trowel RED TOP Keenes Cement finishes until the material sets.

B Float Finish Coats: Scratch plaster in thoroughly and immediately double back to a true, even surface. Float using a (shingle) (cork) (wood) (carpet) or (rubber) float to bring aggregate to the surface to produce a finish of uniform texture free of slick spots, cat faces and other blemishes. Use water sparingly on natural color, and no water on colored finishes. With ORIENTAL Exterior Stucco Finish, use no water in floating or texturing. Fog-spray surface with water for several days after setting.

C Machine-Applied Spray Finishes: Apply plaster uniformly to produce a texture approved by the architect.

3.15 Ornamental Plastering

Execute ornamental plaster in accordance with scale details shown on the drawings. Run cornices and mouldings full, straight and true with moulding plaster, using clean cut metal conforming to the profiles shown on the drawings. Align lines accurately with square intersections, and accurate miters at corners and angles. Prepare enriched ornamental work which cannot be run in place with White HYDROCAL Gypsum Cement cast in gelatine molds. Back the work solidly with jute or burlap and properly reinforce with galvanized steel. Make all joints carefully and point neatly so as to be invisible. Sandpaper rough spots and leave entire work ready for decoration.

3.16 Patching

Point up around trim and other work. Cut out and patch defective and damaged plaster. Patch plaster to match existing work in texture and finish flush and smooth.

3.17 Completion

At the completion of the finish plaster work, clean all plaster from beads, screeds, metal base and metal trim, leaving work ready for decoration by others. Remove all plaster rubbish, excess material, scaffolding, tools and equipment from the building, leaving floors broom clean.



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Technical Services:

Contact the following offices for technical assistance concerning design, materials, systems, detailing and specifications.

Eastern Region:	Atlanta, GA (404) 393-0770 Tarrytown, NY (914) 332-8000
Western Region:	Chicago, IL (312) 606-5788 Glendale, CA (818) 956-1882

Technical Literature

For complete information, specifications and construction details on related United States Gypsum Company products and systems, contact your local United States Gypsum Company sales office for the catalogs shown below.

- SA-700** DUROCK Exterior Cement Board Systems
- SA-707** THERMAFIBER Life-Safety Fire Containment Systems
- SA-921** USG High Attenuation Resilient/Steel Framed Systems
- SA-923** Drywall/Steel Framed Systems
- SA-924** Drywall/Wood Framed Systems
- SA-925** USG Area Separation Wall Systems
- SA-926** USG Cavity Shaft Wall Systems
- SA-927** Gypsum Panels & Accessories
- SA-932** DUROCK Interior Cement Board Systems
- SA-933** Texture and Finish Products
- SA-1119** STRUCTOCORE Security Wall Systems
- UN-30** UNIMAST Steel Framing Systems: Technical Information

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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United States Gypsum Company
101 South Wacker Drive
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A Subsidiary of USG Corporation

USG High Sound-Attenuation Steel Framed Systems



**Economical sound isolation construction systems without the
excessive weight or space required of masonry construction**

USG

USG High Sound-Attenuation Steel Framed Systems

USG High Sound-Attenuation Steel Framed Systems are remarkable developments for constructing walls designed to reduce the transmission of sound. Only United States Gypsum Company has so many systems available to satisfy your specific performance requirements. Their engineered performance with specific proprietary United States Gypsum Company components make these systems the preferred method of constructing sound attenuating walls.

Available in two basic systems, both providing fire-resistant construction: USG High-Attenuation Resilient/Steel-Framed Systems and USG High-Attenuation Double Wall Systems.

USG High-Attenuation Resilient/Steel-Framed Systems

USG High-Attenuation Resilient/Steel-Framed Systems are exclusive United States Gypsum Company designs which are adaptable to meet nearly any acoustic, fire resistance or structural requirement. Partitions can be load bearing or non-load bearing. The structural system is very practical for walls from 8' to 50' or more in height.

Double construction usually is required to achieve high sound isolation. This has been achieved in the past by utilizing two separate rows of studs or two separate masonry walls. Such constructions are not structurally very practical for partitions more than 8' or 9' in height since the acoustic performance is seriously impaired if the two rows are tied together to achieve the structural advantage of "truss" design. High-Attenuation Resilient/Steel-Framed Systems resolve this structural problem by utilizing a stronger single stud. The patented RC-1 Resilient Channel, part of the family of SHEETROCK Metal Products, provides the isolation required to achieve double wall construction acoustic performance.

USG High-Attenuation Resilient/Steel-Framed Systems use straight forward construction techniques. Thus, it is a simple matter to combine the many available United States Gypsum Company components into assemblies which meet a range of design requirements. There are several hundred combinations possible but, basically, all systems are constructed the same way with the components described below.

Major Components

Steel Studs—The steel SJ (Stud/Joist) member is the primary structural element of the system. These members are available in depths from 3½" to 13½" and gauges from 20 to 14. Refer to manufacturer, Unimast Incorporated of Fremont, Ohio, for complete listing of available components and to Drywall/Steel Framed Systems folder SA-923 for structural and load bearing construction information.

Resilient Channel—The patented RC-1 Resilient Channel is a key element in achieving high-performance, acoustic double wall construction while maintaining a highly efficient, monolithic structural system. Tests show that the RC-1 Resilient Channel is acoustically effective as has been proven for over 25 years on millions of square feet of wood frame partition and floor/ceiling systems. It is easy to install and is effective at providing acoustic isolation, especially at low frequencies.

Gypsum Panels—The gypsum panel is the primary sound and fire barrier in these systems. All tests have been conducted using SHEETROCK brand Gypsum Panels, FIRECODE or FIRECODE C Core. These panels are used for their specific properties and any substitution can result in a reduction in the acoustic or fire resistance performance of the system.

Cavity Insulation—THERMAFIBER Sound Attenuation Fire Blankets (SAFB) are used within the stud cavities. This 2.5 pcf nominal density mineral wool blanket is used for its acoustic and fire resistant properties. Substituting a less dense insulation will result in lower acoustic ratings and could result in reduced fire ratings.

Acoustical Sealant—A sealant of the proper mass and resilience is critical if the acoustic performance in the field is to match that in the laboratory. SHEETROCK Acoustical Sealant has been thoroughly sound and fire tested with these systems. SHEETROCK Acoustical Sealant remains permanently resilient and bonds tenaciously to porous or non-porous surfaces. It has a mass approximately the same as gypsum board, is low shrinking, paintable, and can be used with any fire rated partition. Refer to SHEETROCK Acoustical Sealant folder J-678 for additional information.

Joint Compound—All SHEETROCK Joint Compounds can be used with these systems. In multilayer systems, all joints are staggered and joint compound used on the top layer only. Refer to *Gypsum Panels & Accessories SA-927* for additional information.

Screws—The use of the proper screw and screw spacing is necessary to achieve the designed structural, fire and acoustic performance. Refer to *Steel Framing Components & Accessories for Drywall, Plaster & Load-Bearing Construction* (Unimast Incorporated catalog CS-13) for complete information on screws.

Function and Utility

Versatile—Partition can be designed to meet a specific requirement. Or a single layer design which meets an acoustic code requirement can be easily and economically upgraded, for example, party walls in apartments or condos.

Fire Resistant—Constructed of noncombustible components, up to 3-hr. fire ratings are available.

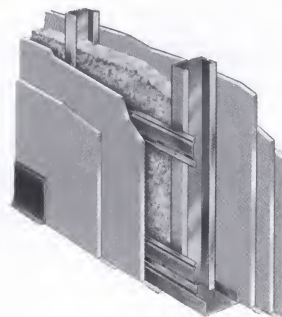
Sound Isolating—Efficient sound insulation at a wide range of frequencies. The multilayer designs provide exceptional isolation at low, mid and high frequencies making them ideal for isolating loud music, mechanical equipment and amplified speech sound sources.

Lightweight, Thin—Allows for the most efficient use of materials and space to meet the needs of a specific project. Structural systems provide means for high acoustic performance, double construction with tall, relatively thin, lightweight partitions.

Economical & Convenient—Low cost, readily available materials install simply and easily; provide highly competitive costs and superior value for the performance offered.



RC-1™ Channel



UNIMAST
SJ Studs

Limitations

- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- 2 The fire resistance ratings and exceptionally high sound ratings are predicated upon use of identical components and installation procedures. This includes proper application of SHEETROCK Acoustical Sealant and installation of THERMAFIBER Sound Attenuation Fire Blankets (SAFB) spaced away from the RC-1 Resilient Channels.
- 3 Maximum stud spacing: 24"; maximum RC-1 Resilient Channel spacing: 24". Ceramic tile is not recommended for application to single layer panels or on the resilient channel side.
- 4 Variable wind pressure can cause a high-rise building to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause or repair of this job related noise.

General Construction Description

Horizontal RC-1 Resilient Channels are screw-attached 24" o.c. to the narrow flange side of SJ steel studs which also are spaced 24" o.c. SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached directly to the studs on one side and to the resilient channels on the other side. THERMAFIBER SAFB are friction-fitted in the partition cavity. The SAFB are pressed against the direct-applied gypsum panel, leaving a minimum 1/8" space between the resilient channel and the SAFB. All resilient channels are installed with mounting flange down. SHEETROCK Acoustical Sealant is applied between the gypsum panel and the floor. SHEETROCK Acoustical Sealant is also used where a resilient channel mounted gypsum panel intersects a wall plane that is not resilient channel mounted, where a gypsum panel meets a dissimilar material, where outlets and other penetrations need to be sealed, and where expansion or other joints need to be sealed to help prevent cracking.

The table below provides construction information for each system and the table on page 4 provides sound transmission loss values.

Sound Rating—The STC and MTC sound ratings for heavier gauge studs and for load-bearing and non-load bearing designs are the same as those shown. The STC rating is appropriate for speech sound sources and the MTC rating for music, machinery or mechanical equipment sound sources.

All sound tests were conducted at Riverbank Acoustical Laboratories, Geneva, Ill. The RAL Test Designation Numbers are listed in the table below, the one-third octave sound transmission loss data are listed on page 4.

Fire Rating—Fire ratings listed are for non-load bearing partitions. Listed fire rating will be maintained with heavier gauge or deeper studs or with stud spacings less than 24" o.c. For fire ratings of load bearing designs using SJ steel studs, refer to folder SA-100 Construction Selector.

All fire tests were conducted at Underwriters Laboratory in Northbrook, Ill. Partitions were sealed in the test opening with SHEETROCK Acoustical Sealant. The UL design number for each partition is listed.

Stud Designation—The stud designation includes the initial numbers indicating stud depth in inches, two letters indicating the steel component, and the final numbers indicating gauge. For example, for 362SJ20, the 362 means 3 1/2", the SJ means stud/joist, and the 20 means 20 gauge.


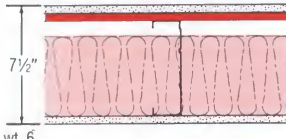
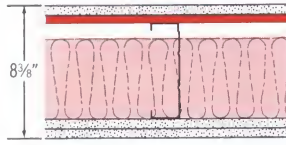
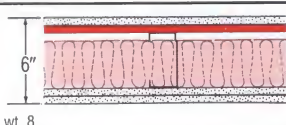
Note—The 35SJ20 stud was used in acoustic and fire tests so the data could be used for both the 3 1/2" and 3 3/8" size.

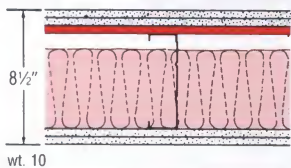
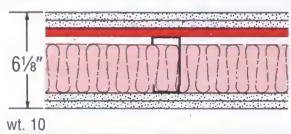
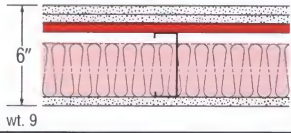
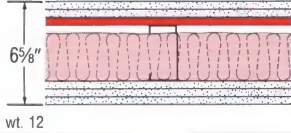
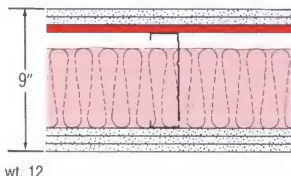
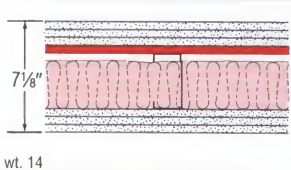
THERMAFIBER SAFB Thickness—Thicknesses of 2" and 3" are standard. A 5" thickness is available on special order or 2" and 3" can be used to achieve the 5" thickness.

Maximum Heights—For typical height limitations of designs using SJ studs, the structural engineer should refer to the page 5 and to SA-923 Drywall/Steel Framed Systems.

Fire and Sound Test Data

■ RC-1 Resilient Channel ■ THERMAFIBER Insulation

Fire rating	Fire-Rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.	 wt. 6	Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U451	50 54	RAL-TL-87-156 (42 MTC) Based on 1/2" thick panels— RAL-TL-83-216 (47 MTC)	A
1 hr.	 wt. 6	Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U451	56 56	RAL-TL-87-139 (48 MTC) Based on 1/2" thick panels— RAL-TL-84-141 (50 MTC)	B
1 1/2 hr.	 wt. 9	Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U452	59	RAL-TL-84-140 (54 MTC)	C
1 1/2 hr.	 wt. 8	Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to studs, 1 layer screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked—UL Des U452	58	RAL-TL-83-215 (52 MTC)	D

2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—double-layer gypsum panels screw-att to studs & RC-1 chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U454	63 62	RAL-TL-87-141 (59 MTC) Based on 1/2" thick panels— RAL-TL-84-139 (58 MTC)	E
2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—2 layers gypsum panels screw-att to chan, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U454	60 61	RAL-TL-87-154 (54 MTC) Based on 1/2" thick panels— RAL-TL-83-214 (57 MTC)	F
2 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—single-layer gypsum panels screw-att to studs, 2-layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U453	58 60 59	Estimated sound test (52 MTC) Based on 1/2" thick panels, 60SJ20 studs, 5" SAFB— RAL-TL-87-140 (54 MTC) Based on 1/2" thick panels, 60SJ20 studs, 5" SAFB— RAL-TL-84-136 (54 MTC)	G
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to studs, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	61 62	RAL-TL-87-153 (56 MTC) Based on 1/2" thick panels— RAL-TL-83-213 (59 MTC)	H
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—60SJ20 studs 24" o.c.—5" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to stud, 2 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	64 63 65	RAL-TL-87-142 (59 MTC) Based on 1/2" thick panels— RAL-TL-84-138 (59 MTC) Based on 5/8" thick panels, acoustical sealant bead between panels and studs, dabs 8" o.c. between panel layers on stud side— RAL-TL-84-150 (60 MTC)	I
3 hr.		Resil Stud Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—362SJ20 studs 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—3 layers gypsum panels screw-att to studs, 3 layers screw-att to chan—panels appl vert with joints stag—joints fin—perimeter caulked— UL Des U455	63 65	RAL-TL-87-152 (58 MTC) 60SJ20 studs, 5" SAFB RAL-TL-87-143 (61 MTC)	J

Sound Transmission loss in decibels (db)⁽¹⁾

RAL-TL design #	One-third octave band center frequencies in Hertz ⁽²⁾																		
	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000
87-156	11	17	16	14	12	17	26	32	38	43	46	51	53	53	52	52	54	55	55
83-216	16*	18*	12	14	13	21	31	35	43	47	51	54	56	57	59	59	62	62	56
87-139	11	16	12	16	21	25	32	38	44	48	51	57	60	60	61	62	62	63	58
84-141	14*	16*	15	14	21	22	34	39	44	48	50	54	55	57	59	59	60	63	61
87-155	13	20	18	17	19	25	33	37	44	48	49	54	56	56	56	59	61	61	58
83-215	16*	18*	22	18	22	28	36	40	47	51	54	57	59	59	60	60	62	63	59
83-215	16*	18*	22	18	22	28	36	40	47	51	54	57	59	59	60	60	62	63	59
87-140	12	17	12	17	27	32	38	43	49	52	55	59	62	63	63	63	64	65	67
84-136	16*	17*	17	19	28	29	38	43	48	52	53	57	58	61	62	61	62	64	63
84-140	16*	17*	20	18	28	28	38	42	48	51	53	57	58	59	61	60	62	64	62
87-154	15	22	22	20	27	33	38	42	48	53	54	59	61	61	60	60	62	64	65
83-214	18*	18*	18	14	21	33	41	45	50	52	57	60	62	62	64	64	66	66	62
87-141	14	18	18	25	33	38	43	46	51	54	56	60	63	64	65	65	66	68	69
84-139	20*	20*	25	24	32	34	43	45	51	54	56	59	61	62	64	63	64	66	65
87-153	17	24	25	23	30	35	41	43	49	54	56	60	62	62	61	61	63	66	67
83-213	20*	19*	25	27	35	36	43	46	52	55	57	60	62	62	64	65	66	66	63
87-142	14	21	24	30	36	41	43	49	52	54	57	61	64	64	66	67	68	70	70
84-138	20*	22*	30	29	35	37	43	47	52	55	57	60	63	64	65	65	66	68	67
84-150 ⁽³⁾	20*	28*	36	35	37	37	44	48	54	56	59	63	66	66	68	66	67	69	66
87-152	23	26	26	29	35	36	42	47	50	55	58	61	64	63	62	61	64	67	68
87-143	17	22	29	34	38	43	45	49	53	55	58	62	65	66	68	68	69	71	71

(1) Sound tests are conducted under ideal laboratory conditions. Comparable field performance depends on the elimination of limiting sound flanking paths and careful attention to the detailing and workmanship. SHEETROCK Acoustical Sealant is required to seal the partition and all cut-outs such as electrical boxes.

(2) Test values for 100 through 5000 Hz frequencies are in strict compliance with ASTM E90-81 and ASTM E413-73 test procedures. Values for 31.5 through 80 Hz were measured with state-of-art equipment and methodology in accordance with ASTM E90-81, but do not meet all the requirements of that standard. Values at 31.5 and 40 Hz marked with an * are calculated.

(3) Acoustical sealant bead (damping) between panels and studs and dabs 8" o.c. between gypsum panel layers on side applied directly to studs.

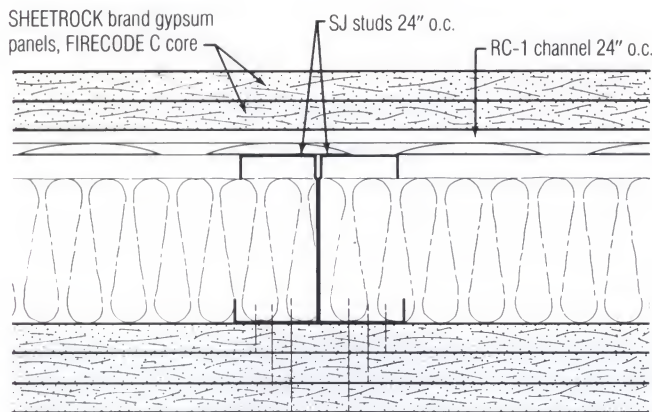
Limiting Heights

Limiting heights are shown below for non-load bearing High-Attenuation Resilient/Steel-Framed Systems with from one layer to three layers SHEETROCK brand Gypsum Panels, FIRECODE C Core, each side. The maximum length UNIMAST SJ Stud available in most areas is 30'. For walls greater than 30' and less than 55' tall, see SA-923.

Stud designation ⁽¹⁾	Stud width	Stud gauge	Wind load/deflection					
			5 psf		10 psf		15 psf	
			L/240	L/360	L/240	L/360	L/240	L/360
362SJ20	3½"	20	14'9"	13'0"	11'9"	10'3"	10'3"	9'0"
362SJ18		18	16'3"	14'3"	13'0"	11'3"	11'3"	10'0"
362SJ16		16	17'6"	15'3"	14'0"	12'3"	12'3"	10'9"
362SJ14		14	18'9"	16'6"	15'0"	13'3"	13'3"	11'6"
40SJ20	4"	20	15'9"	14'0"	12'9"	11'3"	11'3"	9'9"
40SJ18		18	17'3"	15'3"	14'0"	12'3"	12'3"	10'9"
40SJ16		16	18'9"	16'6"	15'0"	13'3"	13'3"	11'6"
40SJ14		14	20'0"	17'9"	16'3"	14'3"	14'3"	12'6"
60SJ20	6"	20	22'0"	19'3"	17'9"	15'6"	15'6"	13'6"
60SJ18		18	24'0"	21'3"	19'3"	17'0"	17'0"	14'9"
60SJ16		16	26'0"	23'0"	21'0"	18'6"	18'6"	16'0"
60SJ14		14	28'0"	24'9"	22'6"	19'9"	19'9"	17'3"
725SJ18	7½"	18	28'3"	24'9"	22'6"	19'9"	19'9"	17'3"
725SJ16		16	30'6"	26'9"	24'6"	21'6"	21'6"	18'9"
725SJ14		14	32'9"	28'9"	26'3"	23'0"	23'0"	20'3"
80SJ18	8"	18	30'6"	26'9"	24'6"	21'6"	21'6"	18'9"
80SJ16		16	33'0"	29'3"	26'6"	23'3"	23'3"	20'6"
80SJ14		14	35'6"	31'3"	28'6"	25'0"	25'0"	22'0"
925SJ16	9¼"	16	37'3"	32'9"	30'0"	26'3"	26'3"	23'0"
925SJ14		14	40'0"	35'3"	32'3"	28'3"	28'3"	24'9"

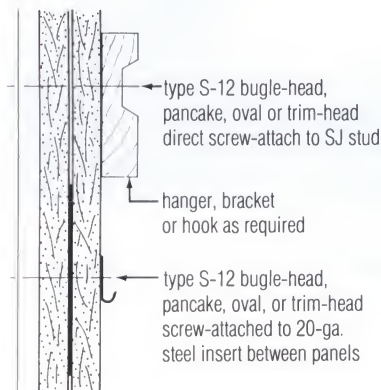
(1) Studs 24" o.c.

Details

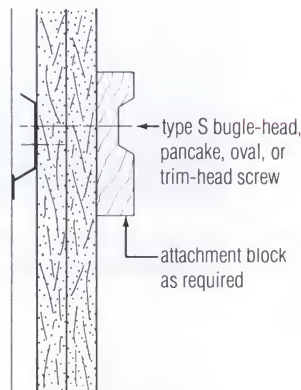


Tall Wall Partition

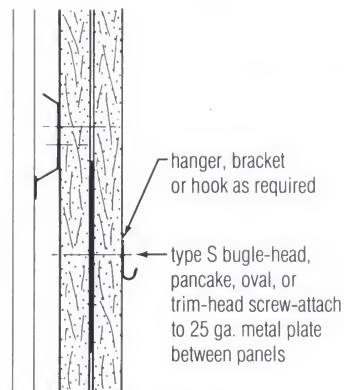
Fastening Methods



To 20 Ga. Insert or SJ Stud Direct



To RC-1 Channel

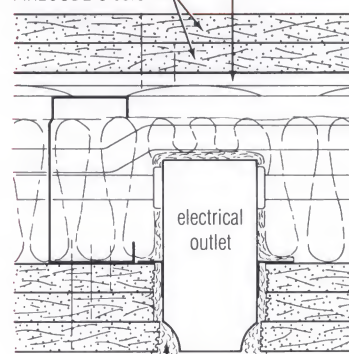


To 25 Ga. Steel Insert

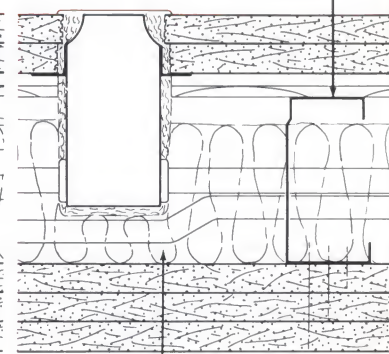
SHEETROCK brand gypsum panels, FIRECODE C core

RC-1 channel

scale: 3" = 1'-0"



seal all openings with SHEETROCK acoustical sealant



3" THERMAFIBER SAFB

Electrical and Communication Outlets/Switches

Note: Electrical outlets are not permitted in walls with fire ratings exceeding 2-hr. unless walls are so tested.

Key Points

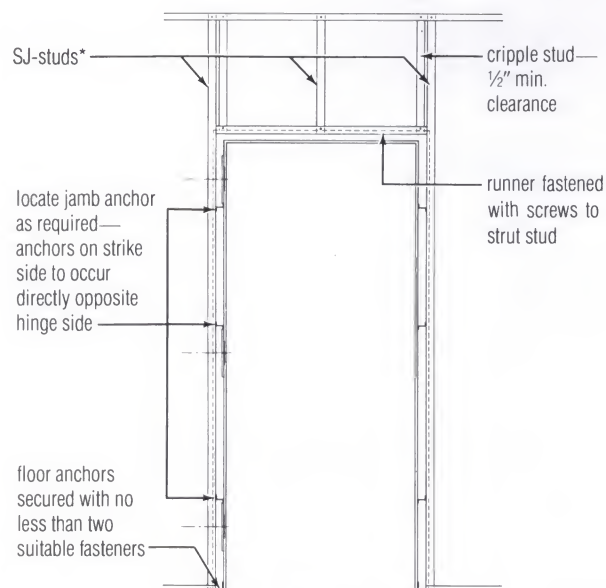
1. Electrical boxes can be rigidly mounted from studs with standard mounting brackets. Do not allow box, mounting brackets or conduit to touch RC-1 Resilient Channels.
2. Allow minimum ¼" space between electrical box and gypsum panels. Fill gap with SHEETROCK Acoustical Sealant. The space can be greater than ¼", but filling gaps greater than about ¾" will usually require several applications of SHEETROCK Acoustical Sealant.
3. Do not allow outlets on both sides of a partition to be in the same stud cavity. Alternate stud cavities as shown.
4. Horizontal conduit is shown. Conduit can also run vertically within each stud cavity. Separate conduit should be used for outlets on opposite sides of the partition.
5. THERMAFIBER SAFB can be notched with a serrated knife to allow space for the conduit.
6. Before installing gypsum panels or SAFB, apply minimum ¼" thickness of SHEETROCK Acoustical Sealant over knockouts or other small holes in the boxes to assure that they are air-tight. If a knockout is missing, wrap with tape and cover with acoustical sealant at least ¼" thick. Back sealing of boxes should be inspected before the gypsum panels and SAFB are installed.
7. Install resilient channels with slot located at stud as shown.

Allowable Load Per Fastener

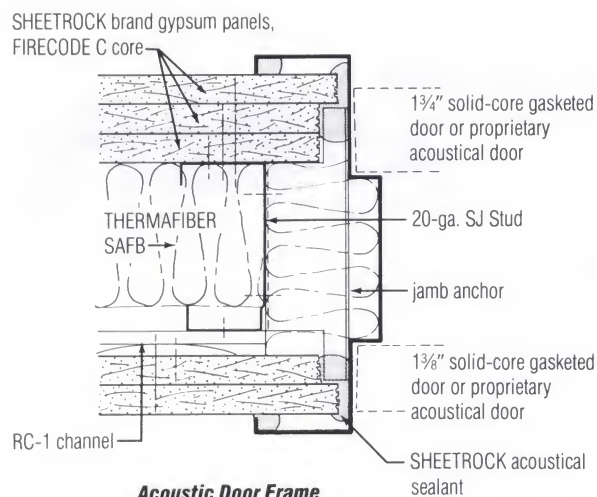
Base assembly	Screw type	Allowable withdrawal resistance		Allowable shear resistance	
		lb.	N ⁽¹⁾	lb.	N ⁽¹⁾
Fasten to resilient channel or to 25-ga. insert	Type S bugle, pancake,	60	267	100	445
Fasten to 20-ga. insert or direct to SJ stud (non-channel side only)	Type S-12 bugle, pancake, oval or trim head	85	378	135	600

(1) Newtons.

Details



Elevation
cross section through frame

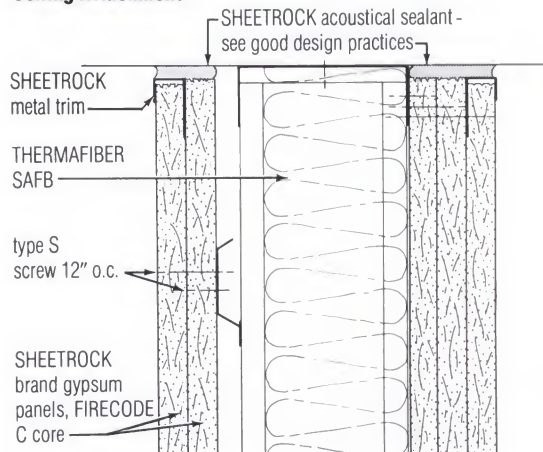


Acoustic Door Frame

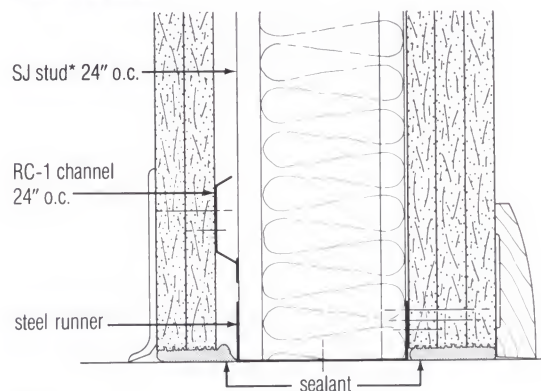
Note: door performance for specific projects to be determined by acoustician. STC50/MTC50 is max. for this door in tandem arrangement. Two separate jambs or vestibules must be used to achieve required higher sound ratings.

*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast, Inc.

Ceiling Attachment



Floor Attachment

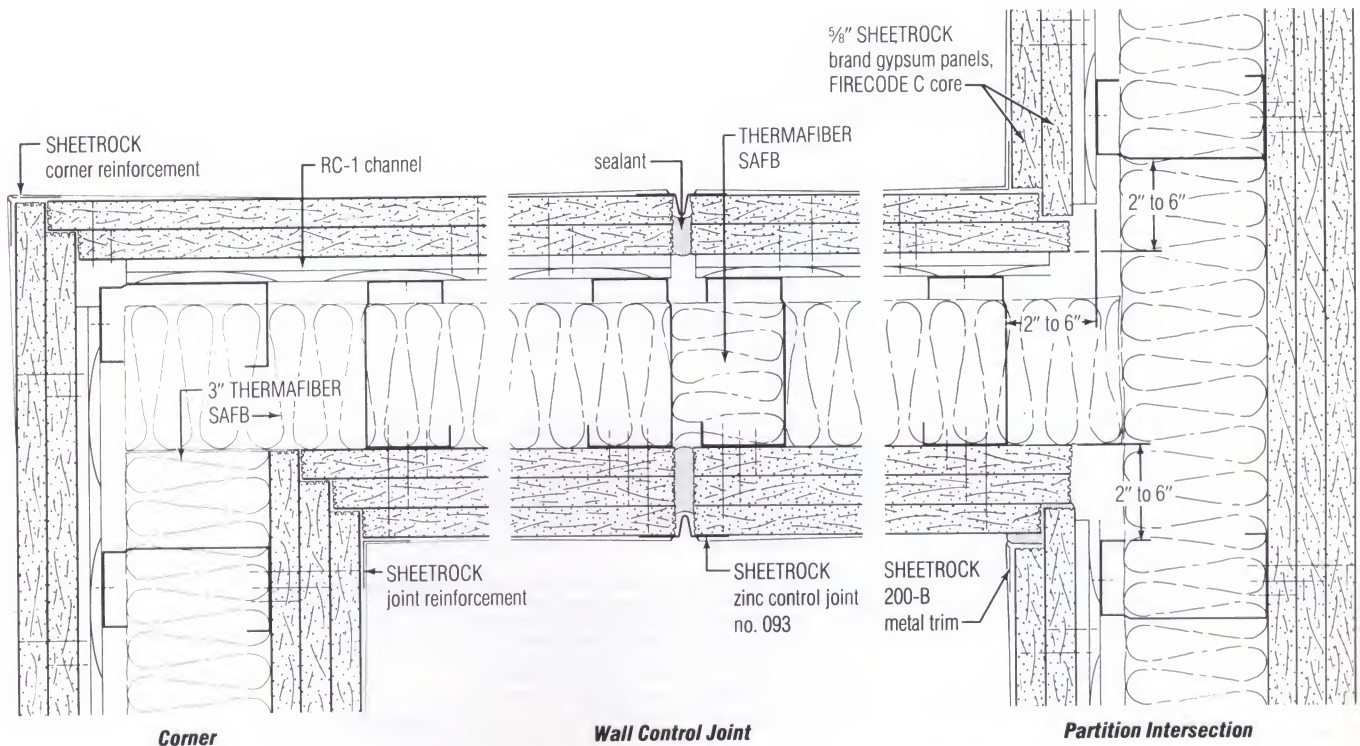
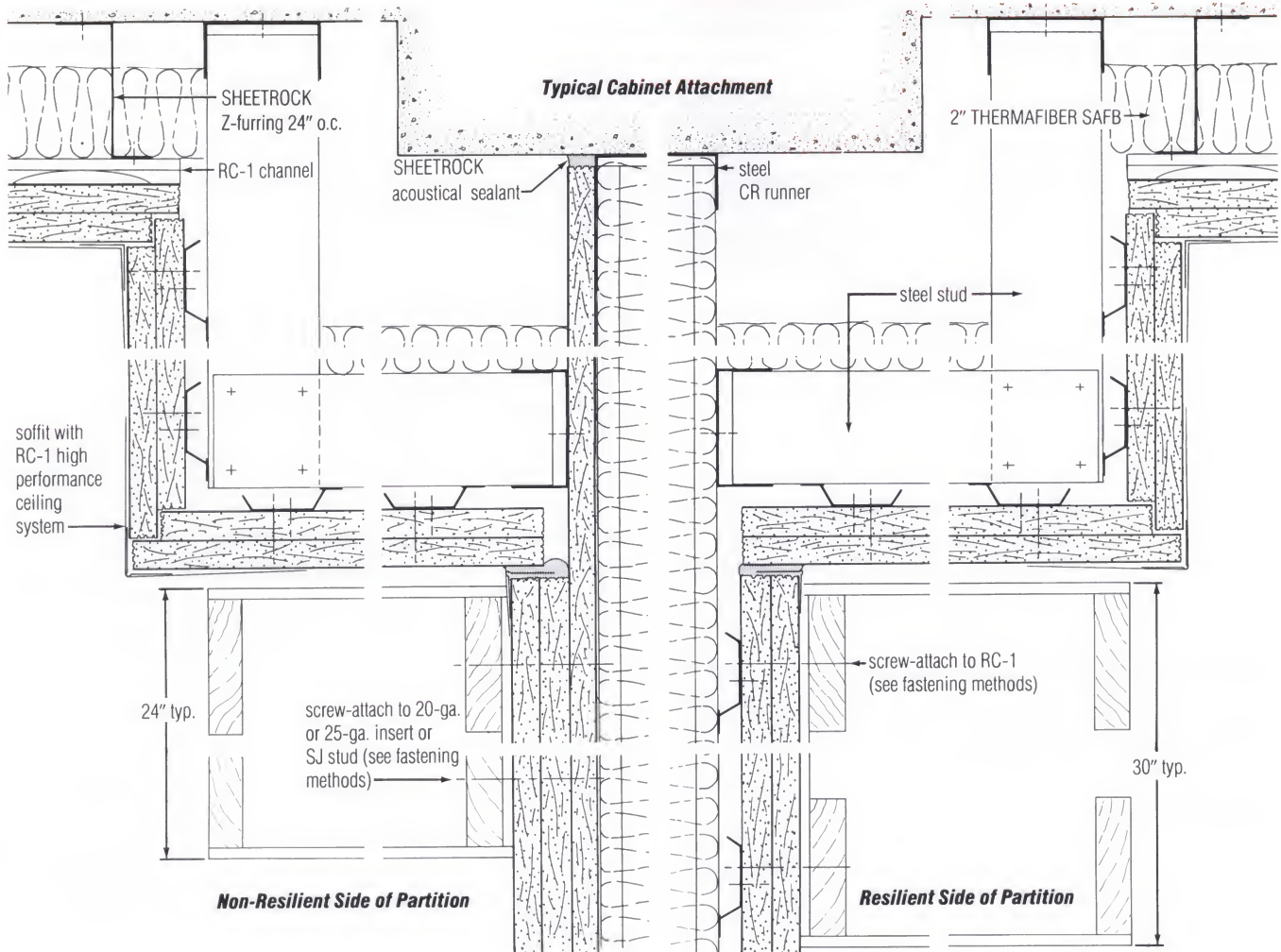


Note: screw fastened gypsum panels to resilient channel must not come in contact with any stud.

*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast, Inc.



Acoustical isolation of movie sound from adjacent theater is accomplished with USG High-Attenuation Resilient/Steel Framed System.



USG High Sound-Attenuation Double Wall Systems

USG High-Attenuation Double Wall Systems provide low-frequency sound attenuation and fire resistance plus in-place economy: simple assembly design for fast installation and low-cost, conventional materials. Component commonality means flexibility and even greater economy on jobs employing more than one of these designs.

These non-load bearing, lightweight, drywall assemblies include: ten USG Double Walls, using C-H splines (for higher partitions) or H-splines; and one USG Furring Wall, using H-splines. All USG Double Walls span floor-to-ceiling unbraced with: (1) C-H spline or H-spline liner panel stiffening, (2) THERMAFIBER Sound Attenuation Fire Blankets (SAFB) ranging from 3" to 12" thick, (3) single- or double-layer facings of ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or as an option, SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core.

USG Double Wall partition attained excellent ratings in tests at Riverbank Acoustical Laboratories Inc. for sound and Underwriters Laboratories Inc. for fire: 60 STC for speech, 57 MTC for music/machine noise, and a 3-hr. fire rating. Sound ratings were based upon application of SHEETROCK Acoustical Sealant, in a single ½" bead, vertically to the center of each liner panel before application of the facing panels, and to seal around the partition perimeter on both sides.

USG Double C-H Walls are intended for greater partition heights than USG Double H Walls. USG C-H Studs in one of three steel gauges (20, 22 and 25) are substituted for the 20-ga. USG H-Splines of the basic USG Double H Wall assembly, allowing maximum heights up to 16'.

USG Double H Walls effectively attenuate all types of sound, including the low frequencies prevalent in machine noise and music. They are highly suitable for party walls, corridors, plumbing chase walls, and mechanical equipment rooms in apartments, hotels/motels and hospitals. These assemblies utilize two USG Furring Walls back-to-back spaced from 3½" to 12½" apart depending on the design. The cavity is filled with THERMAFIBER SAFB ranging from 3" to 12" thick.

USG Furring H Wall, intended only for furring, is simply an uninsulated half of the symmetrical basic USG Double H Wall. Using a furred wall can provide a fresh wall surface often more cost-effectively than solving the many problems of old walls, especially in retrofit or remodeling work. USG Furring Wall can greatly improve

thermal and sound performance of an exterior wall, saving energy and diminishing outside noise intrusion. It also minimizes the problem of shadowing (over fasteners), on interior surfaces. This assembly consists of ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core facings, applied over 1" SHEETROCK brand Gypsum Liner Panels screw-attached to 1½"x ¼"x24 ga. metal angle runners anchored at floor and ceiling. Alternating with the liner panels, and stiffening them vertically, are friction-fit 1" steel H-splines, to which the facing panels are screw-attached.

Function and Utility

Versatile—Adaptable as corridor partitions or party walls, and for enclosing mechanical equipment rooms in most types of new construction—commercial, institutional and residential.

Fire Resistant—Constructed of noncombustible components, USG Double H Walls are fire rated 3 hr. in UL Design U441.

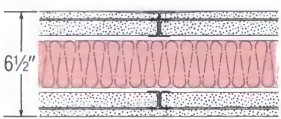
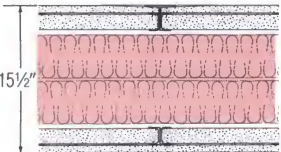
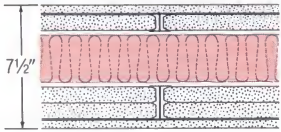
Sound Isolating—STC/MTC sound ratings of: 60/57 when damped with ½" beads of SHEETROCK Acoustical Sealant at 24" o.c., or 57/57 undamped.

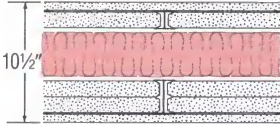
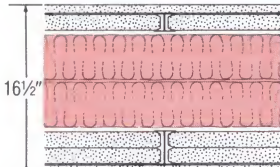
Lightweight, Thin—All USG High-Attenuation Double Wall assemblies are thinner, and weigh substantially less than masonry of comparable STC/MTC ratings.

Economical—Low-cost materials, simple design with few components, and simple installation provide competitive costs for their superior performance.

Limitations

- 1 Non-load bearing.
- 2 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- 3 Sound ratings are predicated upon use of all components identical to those listed in the sound test descriptions, including, where indicated, application of SHEETROCK Acoustical Sealant between liner and facing panels, and THERMAFIBER SAFB in cavities.
- 4 Maximum partition heights as shown in limiting heights table on facing page.
- 5 Variable wind pressure can cause a high rise building to drift or sway. This may result in noise, caused by movement of the non-load bearing partitions. United States Gypsum Company assumes no responsibility for prevention, cause or repair of this job-related noise.

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
3 hr.		Double Wall Drywall—½" SHEETROCK brand gypsum panels, FIRECODE C core—two rows of 1" SHEETROCK brand gypsum liner panels spaced 3" apart and screw-att to steel angle runners—liner panels set betw 1" H-splines 24" o.c.—3" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—perim caulked—joints fin—UL Des U441	57 60 62	TL-83-211 (MTC 57) TL-83-313 (MTC 57) Based on vertical centerline acoust sealant beads TL-83-232 (MTC 60) Based on liner panels spaced 6½", 6" SAFB, and vertical centerline acoust sealant beads	A
3 hr.		Double Wall Drywall—½" SHEETROCK brand gypsum panels, FIRECODE C core—two rows of 1" SHEETROCK brand gypsum liner panels spaced 12" apart and screw-att to steel angle runners—liner panels set betw 1" H-splines 24" o.c.—12" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—½" bead SHEETROCK acoustical sealant for damping vertical centerline, caulking perimeter—joints fin—UL Des U441	65	TL-83-229 (MTC 62)	B
3 hr.		Double Wall Drywall—½" SHEETROCK brand gypsum panels, FIRECODE C core—one row of single-layer, one row of double-layer 1" SHEETROCK brand gypsum liner panels spaced 3" apart and screw-att to steel angle runners—single-layer liner panels set betw 1" H-splines 24" o.c., double-layer liner panels set betw 2" H-splines 24" o.c.—3" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—perim caulked—joints fin—UL Des U441	63	TL-83-222 (MTC 58)	C

3 hr.		Double Wall Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—one row of single-layer, one row of double-layer 1" SHEETROCK brand gypsum liner panels spaced 6 1/2" apart and screw-att to steel angle runners—liner panels set betw 1" and 2" H-splines 24" o.c.—6" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—1/2" bead SHEETROCK acoustical sealant for damping vertical centerline, caulking perimeter—joints fin— UL Des U441	66	TL-83-231 (MTC 61)	D
3 hr.		Double Wall Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—one row of single-layer, one row of double-layer 1" SHEETROCK brand gypsum liner panels spaced 12 1/2" apart and screw-att to steel angle runners—liner panels set betw 1" and 2" H-splines 24" o.c.—12" THERMAFIBER SAFB in cavity—face panels screw-att to H-splines—1/2" bead SHEETROCK acoustical sealant for damping vertical centerline, caulking perimeter—joints fin— UL Des U441	69	TL-83-226 (MTC 62)	E

*SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, may be substituted in tests and attain same fire and sound ratings.

Sound transmission loss⁽¹⁾—dB (USG Double H Walls)

Sound test ⁽²⁾ ratings		Wt. (psf) /cost index	Band center frequency—Hz																							
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	
STC/MTC	Test no.																									
60/57	TL-83-313	13.7/1.83	20	22	24	27	33	35	41	47	52	55	57	58	58	59	59	61	62	62	62	62	62	64	67	
57/57	TL-83-211	13.6/1.74	18	19	21	24	33	36	41	45	49	53	53	51	54	56	57	57	59	60	60	58	58	59	61	
62/60	TL-83-232	14.0/1.91	20	24	30	31	41	43	44	49	54	56	59	59	59	61	62	62	63	64	65	63	61	62	66	
65/62	TL-83-229	15.2/2.16	22	26	32	36	37	40	46	51	55	57	60	61	62	64	65	66	67	68	70	68	68	71	76	
63/58	TL-83-222	17.6/1.95	22	22	28	31	39	38	43	46	53	56	58	57	57	61	64	66	68	68	70	69	67	69	72	
66/61	TL-83-231	18.3/2.08	21	25	31	36	44	42	46	52	56	59	61	61	63	66	69	69	68	68	66	66	70	75		
69/62	TL-83-226	19.2/2.29	27	31	34	36	42	44	46	50	57	59	62	63	65	68	71	73	73	74	75	75	74	76	79	

(1) Test values for 100- through 5000-Hz frequencies are in strict compliance with ASTM E90-81 and ASTM E413-73 test procedures. Values for 50- through 80-Hz were measured in accordance with ASTM E90-81, but do not meet the requirements of that standard. Values for 31.5- and 40-Hz frequencies were calculated. Note that below-100 Hz values were derived by state-of-the-art methods, but neither United States Gypsum Company nor the independent testing agency, Riverbank Acoustical Laboratories, can assure similar results in other test environments.

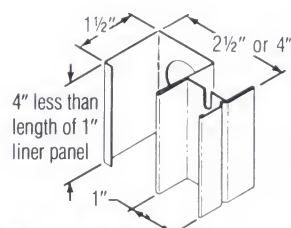
(2) MTC is an index of partition performance in low-frequency sound isolation, a single-number rating especially significant for music, motors and some other types of mechanical equipment. It is a direct result of methodology developed by United States Gypsum Company. All test specimens were USG Double H Walls, with SHEETROCK Acoustical Sealant applied around both sides of partition perimeter, and on some, also in vertical centerline beads between liner and face panels.

Structural Data

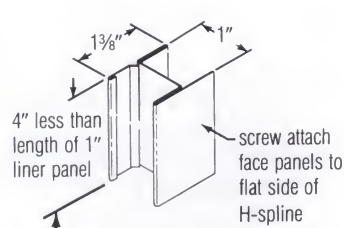
Limiting heights⁽¹⁾—USG High-Attenuation Double Wall System

Assembly	Authority	Attaching screws + sealant for facing/base panels	Allow. defl.	Max. partition ht. ⁽¹⁾		
				Stud or spline gauge		
C-H stud (212CH [ga]) Double Wall	USG Research report no. 31320	1" Type S-12 @ 12" o.c., into splines, plus bead of SHEETROCK Acoustical Sealant at vertical centerline of each panel	L/120	16'0"	15'6"	13'9"
			L/240	12'9"	12'3"	11'0"
Double H Wall	Pittsburgh Testing Laboratories report no. CH 6177	1" Type S-12 12" o.c., into splines	L/120	10'9"	—	—
			L/240	8'6"	—	—
Furring H Wall			L/120	10'6"	—	—
			L/240	8'4"	—	—

(1) Values assume a uniform wind load of 5 psf, horizontally applied; all were limited by allowable deflection and determined according to ASTM E72 test method. For additional heights, see USG Area Separation Walls folder SA-925.

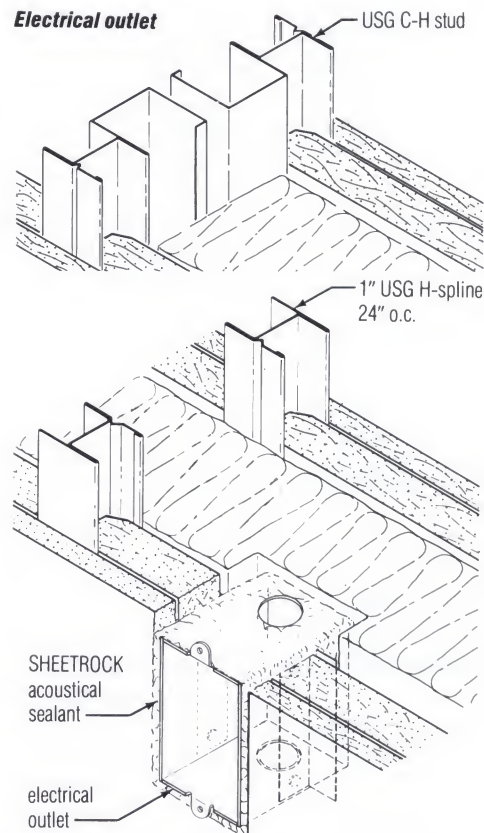


USG steel C-H stud (CH)



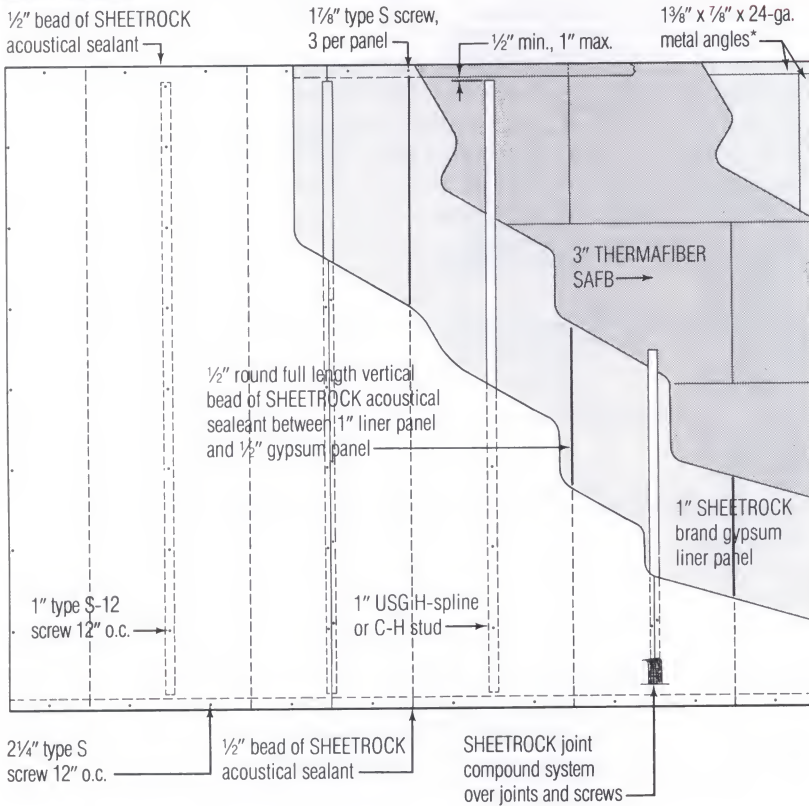
USG H-spline (20-ga.)

Electrical outlet

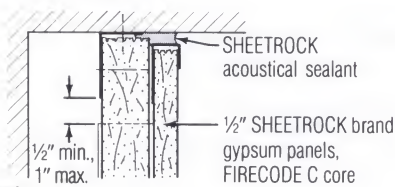


Note: Electrical outlets are not permitted in walls with fire ratings exceeding 2-hr. unless walls are so tested.

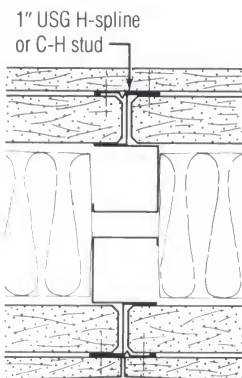
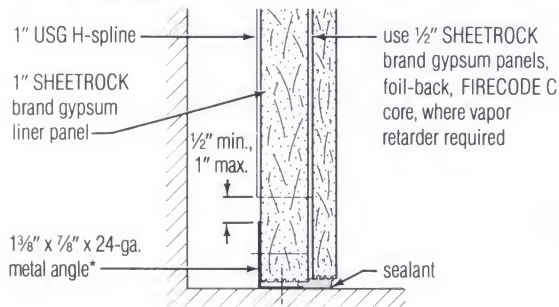
Wall elevation



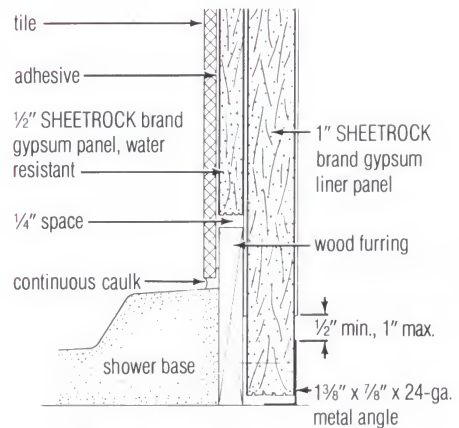
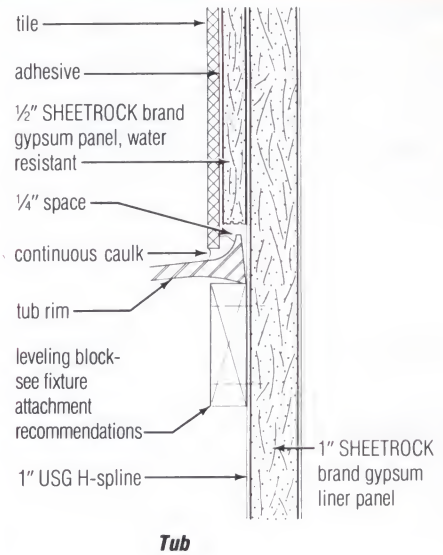
Ceiling attachment —furring wall



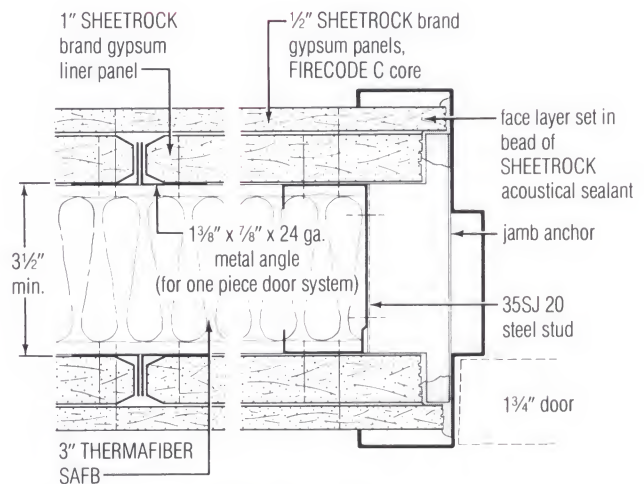
Floor Attachment



Panel joint



Shower receptor



Standard door frame

(for acoustic doors consult specialist)

Good Design Practices

- 1 System Performance**—Assemblies are tested according to established procedures specified by various agencies. United States Gypsum Company will provide test certification of published fire, sound and structural data covering systems designed and constructed according to its published specifications. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions. To ensure rated acoustical performance of these assemblies, special care should be taken not to short-circuit, with rigid connections, the resiliency upon which assembly performance is dependent. Electrical conduit and convenience outlets, HVAC ductwork, plumbing lines, and related items within the cavities should be attached only in a manner that preserves the resiliency in partition diaphragms. The use of SHEETROCK Acoustical Sealant caulking to seal all openings and THERMAFIBER SAFB in the partition cavity is essential in achieving the desired STC/MTC performance.
- 2 Shadowing**—During periods of low outside temperature, condensation may form on the inside of exterior walls, collecting airborne dirt to produce "photographing," or "shadowing," over fasteners and furring. This natural phenomenon occurs through no fault of the products.
- 3 Control Joints**—Gypsum panel surfaces should be isolated with control joints or other means where: **(a)** partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; **(b)** construction changes within the plane of partition or furring; **(c)** partition or furring run exceeds 30 ft. Ceiling-height door frames may be used as control joints. Less-than-ceiling-height frames should have control joints extending to the ceiling from both corners.
- 4 Penetrations**—Concentrated stress can occur in the gypsum panels at corners of penetrations such as door frames, vents, access panels, etc. Judgment is required to determine if the opening is likely to result in stresses high enough to cause cracking. If expansion/contraction or other stress movement is anticipated, an expansion joint may be required.
- 5 Ceramic/plastic Tile**—For USG High-Attenuation Double Wall Systems, SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, are recommended as a base on walls for adhesive application of ceramic or plastic tile, or plastic-faced wall panels.
- 6 Trim**—For USG High-Attenuation Double Wall Systems, wood base trim should be applied with trim-head screws spaced at 12" o.c. (each stud and midway between).
- 7 Additional Information**—See technical folders in this series: *Construction Selector SA-100* for fire- and sound-rated systems; *Gypsum Panels and Accessories SA-927* for information on system components and *Drywall/Steel Framed Systems SA-923* for additional information on steel stud framing.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed directions.

All studs, runners and other accessories identified as UNIMAST products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems.

Upon request United States Gypsum Company will provide product certification that these products conform to the applicable Company and ASTM standards and meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70° F (13° to 21° C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A** Gypsum Panels—SHEETROCK brand Gypsum Panels, FIRECODE C Core, (Water-Resistant) (½") (¾") thick, 48" wide, lengths as required.
- B** Liner Panels—SHEETROCK brand Gypsum Liner Panels, bevel edge, 1" thick, 24" wide, lengths as required.
- C** Splines—USG (C-H Stud No. [212CH20, 20 ga.][212CH22, 22 ga.][212CH25, 25 ga.], 2½" deep)(H-Spline, No. [100HS20][200HS20], 20 ga., [1][2]" deep) by 1½" wide flanges by lengths as required, corrosion-resistant steel.
- D** UNIMAST Metal Angles—(¾"x¾"x24 ga.) (2½"x2½"x24 ga.) corrosion-resistant steel, lengths as required.
- E** UNIMAST Steel Studs—(362SJ20) (362SJ18) (362SJ16) (362SJ14) (40SJ20) (40SJ18) (40SJ16) (40SJ14) (60SJ20) (60SJ18) (60SJ16) (60SJ14) (80SJ18) (80SJ16) (80SJ14) (115SJ16) (925SJ16) (925SJ14) (115SJ14) (135SJ14).
- F** UNIMAST Steel Runners—(362CR20) (362CR18) (362CR16) (362CR14) (40CR20) (40CR18) (40CR16) (40CR14) (60CR20) (60CR18) (60CR16) (60CR14) (725CR18) (725CR16) (725CR14) (80CR18) (80CR16) (80CR14) (925CR18) (925CR16) (115CR16) (115CR14) (135CR14).
- G** RC-1 Resilient Channel.
- H** SUPER-TITE DRILLERS Screws—(1") (1¼") (1½") (1¾") (2") (2½") Type S-12 bugle head; SUPER-TITE (½") (¾") Type S-12 pan head; (1¾") (2¼") Type S bugle head.
- I** Sound Insulation—THERMAFIBER Sound Attenuation Fire Blankets (SAFB), (3") (5")x24"x48".
- J** Joint Treatment—(select a United States Gypsum Company Joint System)
- K** Corner Bead—(No. 103 DUR-A-BEAD) (No. 800 Expanded Flange Corner Bead).
- L** SHEETROCK Metal Trim—No. (200-A) (401) (402) (P-1) (801-A) (801-B).
- M** Caulking—SHEETROCK Acoustical Sealant.
- N** Control Joint—SHEETROCK Zinc Control Joint No. 093.

Part 3: Execution

3.1 USG High-Attenuation Resilient/Steel Framed Systems

3.1.1 Stud System Erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced max. 24" o.c. Position studs vertically, engaging floor and ceiling runners, and spaced 24" o.c. Place studs with open side facing in same direction. Position resilient channels horizontally with mounting flange down and attach to narrow stud flange with ¾" Type S-12 pan head screws. Locate channels 1½" from floor, within 6" of ceiling and max. 24" o.c.



3.1.2 Sound Blanket Installation

Friction fit sound attenuation fire blankets between studs with min. $\frac{3}{8}$ " space between blankets and resilient channels. Butt blanket ends tightly and fill all voids.

3.1.3 Gypsum Panel Erection

Cut gypsum panels $\frac{1}{2}$ " shorter than floor-to-ceiling height and apply vertically with $\frac{1}{4}$ " gap at floor, ceiling and abutting intersections. Use $\frac{1}{4}$ " thick shims at the floor to support the panels on the resilient channel side until all screws are installed. Remove shims so gypsum panels are supported by the resilient channels. Channels will deflect when properly loaded. Position panel edges over studs on the direct applied side. Stagger joints in adjacent layers.

For direct-application side, apply first layer to studs with (1") (1 $\frac{1}{4}$ ") SUPER-TITE DRILLERS Screws (12") (24") o.c., apply second layer with 1 $\frac{1}{2}$ " SUPER-TITE DRILLERS Screws (12") (24") o.c. and apply third layer with 2 $\frac{3}{4}$ " SUPER-TITE DRILLERS Screws 12" o.c. For resilient side, install gypsum panels vertically. Fasten first layer to channel flanges with (1") (1 $\frac{1}{2}$ ") SUPER-TITE Screws spaced (12") (24") o.c., apply second layer with 1 $\frac{1}{2}$ " SUPER-TITE Screws spaced 12" o.c. Screws fastening the gypsum panels to channels must not come in contact with a stud. To avoid this possibility, screws shall not be spaced closer to the centerline of a stud than 3".

3.2 USG High-Attenuation Double Wall Systems

3.2.1 Furring Wall/Double-Wall Partition Installation—Support Member Attachment

Lay out partitions according to the drawings, accurately aligning and securely attaching metal angle runners to floor/ceiling structural supports with suitable fasteners at 24" o.c. Space double wall runners min. (3 $\frac{1}{2}$ ") (6 $\frac{1}{2}$ ") (12 $\frac{1}{2}$ ") apart, (back-to-back) (as detailed on the drawings).

3.2.2 Liner Panel Application

Cut liner panels accurately to length to fit between floor and ceiling and (C-H studs)(H-splines) 4" shorter than adjacent panels. Erect liner panels and (C-H studs)(H-splines) alternately, between floor and ceiling metal angle runners, friction-fitting panels into splines at each panel joint. Center splines between flanges of floor runners and ceiling runners, with a $\frac{1}{2}$ " gap at each end. To runner vertical flange, at both floor and ceiling, attach each liner panel width with three 1 $\frac{1}{8}$ " Type S screws, at the center and 3" from each edge.

At intersections, form corners as detailed, with corner angles attached to liner panels with 1 $\frac{1}{8}$ " Type S Screws at 12" o.c.

To frame door opening, insert steel studs between floor and ceiling runner flanges and screw-attach through them. Cut liner panels to fit above door head; engage bottom edges in floor anchors and secure top of panels to ceiling runner, same as with full-height panels.

At electrical switch boxes and convenience outlets, cut out panels accurately to fit.

Secure cabinets and other heavy wallhung units to splines, or as otherwise detailed, with fasteners of appropriate type and ample load rating.

3.2.3 Sound Insulation Installation

Install sound insulation blankets to run horizontally in cavity between the two planes of liner panels. Butt ends closely.

3.2.4 Face Panel Application

Use water-resistant panels around bathtubs, showers, laundry/slop sinks and other high-moisture areas, regular type for all other areas. Cut gypsum face panels to length $\frac{1}{2}$ " shorter than floor-ceiling height.

First apply a $\frac{1}{2}$ " damping bead of SHEETROCK Acoustical Sealant, if specified for the assembly, along vertical centerline of each liner panel. Then apply face panels vertically with a $\frac{1}{4}$ " gap, top and

bottom. Impact face panel over sealant bead, with a hammer and short 2x4, for good bond. Center vertical panel joints over splines, and attach panel edges to them with 1" Type S-12 screws at 12" o.c., staggered at abutting edges. Attach to runners at top and bottom with 2 $\frac{1}{4}$ " Type S screws at 12" o.c. Caulk with acoustical sealant: wall and column intersections; all gaps around face panels at floor, ceiling and vertical intersections; in door frames; and at all cutouts for electrical boxes, pipes and plumbing, and other partition penetrations.

3.3 Accessory Application

A Corner Bead—Reinforce all outside corners with corner bead, mechanically attach with $\frac{5}{16}$ " staples or with SUPER-TITE Screws at 9" o.c. along each flange.

B Metal Trim—Apply over all panel edges terminating at dissimilar materials, attach with screws or $\frac{5}{16}$ " staples at 9" o.c.

C Screws—Power-drive $\frac{3}{8}$ " min. from edges, to uniform depth forming a $\frac{1}{2}$ " deep dimple in panel surface.

D Control Joints—Break panels behind joint and back by double framing supports. Apply a bead of SHEETROCK Acoustical Sealant between face panels at joint location, then attach control joint to face panels with $\frac{5}{16}$ " galvanized staples at 6" o.c. along each flange.

E Joint System—Finish face panel joints and inside corners with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

In areas to be tiled, treat all fastener heads and fill tapered edges of gypsum panels with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. Embed SHEETROCK Joint Tape firmly in compound and wipe off excess. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

Prior to tile application, seal substrate with thinned tile adhesive, and seal all cut panel edges around openings for pipes, fittings and fixtures. Remove spacer strips but do not caulk gap at the bottom of panels.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, SHEETROCK, FIRECODE, RC-1, DUR-A-BEAD, DURABOND, THERMAFIBER, EASY SAND, SUPER-TITE, UNIMAST and DRILLERS are trademarks of Unimast, Incorporated. Type S-12 is a trademark of ITW Buildex.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Technical Services: Contact the following offices for technical assistance concerning design, materials, systems, detailing and specifications.

Eastern Region: Atlanta, GA (404) 393-0770; Tarrytown, NY (914) 332-8000

Western Region: Chicago, IL (312) 606-5788; Glendale, CA (818) 956-1882

Headquarters Office: Chicago, IL (312) 606-3739

United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

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Drywall/Steel Framed Systems



For interior applications and exterior curtain wall assemblies

USG

Interior Framing Systems	3-19
Partitions	3
Steel Framing Tables	6
Construction Details	8
Chase Wall	11
Resilient Channel Partitions	11
Curved Drywall Partitions	12
Tall Walls	12
Fixture Attachment	13
Shelf-Wall System	13
Drywall Soffits	14
Floor/Ceilings	14
Column and Beam Fireproofing	18
Exterior Framing Systems	20-30
Exterior Curtain Walls	20
Stud Selector Guide	21
Steel Framing Tables	22
Construction Details	24
Exterior Wall Furring	27
Technical Data	31-39
Good Design Practices	31
Architectural Specifications	34

UNIMAST Steel Products: Studs, runners and other accessories identified as UNIMAST products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein. Refer to UNIMAST catalog *UN-30 Steel Framing Systems: Technical Information* for complete data on steel framing products.



Notice: The material contained in this Folder concerning exterior framing systems, including, but not limited to, test data, technical data, details, specifications and Good Design Practices, portray construction methods in use at the time this Folder went to press. They are not intended to replace or supercede specific specifications and construction documents for a given building.

Partitions

Description

These lightweight, fire and sound-resistant assemblies consist of SHEETROCK brand Gypsum Panels screw-attached to steel framing. A specially designed self-tapping steel screw with rust inhibitive coating attaches panels to framing. The systems are completed with a United States Gypsum Company joint system and decorating—both steps unnecessary in walls when pre-decorated TEXTONE Vinyl-Faced Gypsum Panels are used.

Gypsum panels for these assemblies are available in three thicknesses and seven types (see Specifications). Systems using SHEETROCK brand Gypsum Panels, FIRECODE Core, and SHEETROCK brand Gypsum Panels, FIRECODE C Core, with a specially formulated core, obtain higher fire ratings than regular gypsum panels (see page 4). Panels are applied to UNIMAST Steel Studs, RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) or UNIMAST Metal Furring Channels to meet design requirements for fixed interior partitions—divider, corridor, party and chase walls; furred and suspended ceilings; wall furring and column fireproofing, as outlined below:

- 1 Partitions**—Single-layer $\frac{5}{8}$ " SHEETROCK brand Gypsum Panels, FIRECODE Core, applied to steel studs, set in runners, provide economical 1-hour fire-rated partitioning for corridors or within units. Exclusive creased THERMAFIBER Sound Attenuation Fire Blankets (SAFB) systems offer 51 to 55 STC ratings and 1-hour fire ratings at the lower in-place costs of single-layer assemblies. A 1-hour rating is also available with $\frac{1}{2}$ " thick panels and $1\frac{1}{2}$ " THERMAFIBER SAFB installed in the stud cavity. Double-layer $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, attached to $2\frac{1}{2}$ " or $3\frac{1}{2}$ " studs spaced 24" o.c. provide a 2-hour fire rating plus sound control suitable for party walls. Multi-layer $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, assemblies offer 3- and 4-hour fire ratings and up to 62 STC, yet are much lighter weight and thinner than concrete block. These assemblies also provide a 3-hour fire-resistant enclosure for steel trusses in staggered truss systems. Where added partition width is required, double rows of studs are erected to provide chase walls with up to 20 $\frac{3}{4}$ " net pipe chase width (see page 11). For high-attenuation partitions to isolate low-frequency noise, see folder SA-921.

Shaft Walls—Gypsum panels, assembled with gypsum shaft wall liner and specially shaped USG C-H Studs, offer systems ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see separate USG Cavity Shaft Wall Folder SA-926 for applications).

- 2 Ceilings**—Single-layer $\frac{5}{8}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to furred or suspended metal furring channels 24" o.c. provide a 3-hour fire rating including beam protection (see page 15). The systems are also suitable for separate beam protection and for exterior ceilings and soffits with SHEETROCK brand Exterior Gypsum Ceiling Board facings (see pages 14 and 19).
- 3 Wall Furring**—With SHEETROCK brand Gypsum Panels, Foil-Back, screwed to metal furring channels, this construction provides an excellent vapor retarder as interior and exterior wall furring (see page 27). Panel application to SHEETROCK Z-Furring Channels with semi-rigid insulation provides a fully insulated wall at a cost competitive with many non-insulated furred walls.
- 4 Column and Beam Fireproofing**—SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to steel studs at column corners and finished with corner bead and joint compound, offer lightweight, compact fire protection for steel columns (see page 18).

Function and Utility

When properly selected and constructed in a workmanlike manner, systems are adaptable to virtually every type of new construction—commercial, institutional, industrial and residential—or in modernization to provide smooth, durable interior surfaces.

Fire Resistant—Established fire ratings available to meet design requirements; partitions up to 4 hours, ceilings up to 3 hours, beam and column fireproofing up to 4 hours.

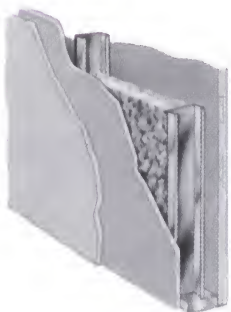
Sound Isolation—STC ratings up to 62 for multi-layer, 55 for double-layer and 55 for single-layer resilient partitions; 54 for single-layer ceilings. THERMAFIBER SAFB improve sound control.

Lightweight—These thin, drywall assemblies weigh only 5 to 17 psf, reduce dead load and save floor area.

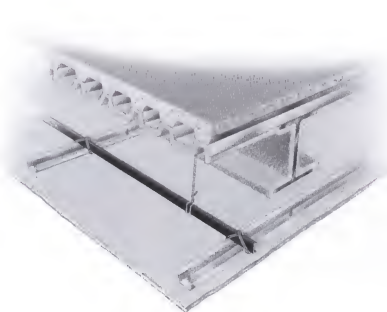
Economical—Low material cost and speed of erection provide realistic and competitive construction costs.

Limitations

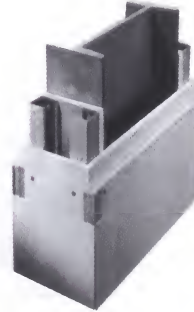
- 1 Non-load bearing.**
- 2 Exposure to excessive or continuous moisture and extreme temperatures should be avoided.**
- 3 Maximum frame spacing is 24" o.c., exception: when single-layer ceiling panels are applied with long edges parallel to joists and used as a base for spray-applied texture finish, max. frame spacing is 16" o.c.**
- 4 In ceiling design, certain precautions concerning construction, isolation and ventilation are necessary for good performance (see Good Design Practices, page 31).**



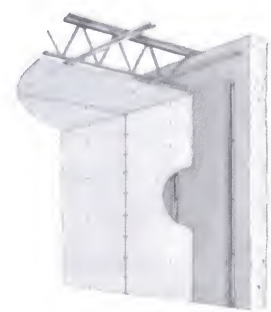
2-hour party wall



2-hour floor/ceiling


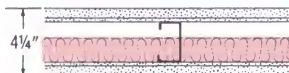
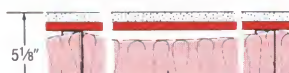

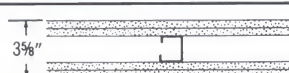


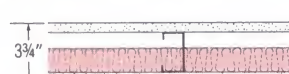



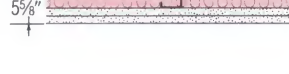



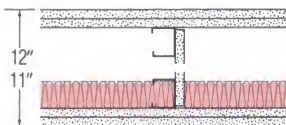

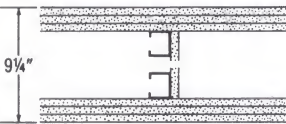

2-hour column fireproofing



Metal channel wall furring

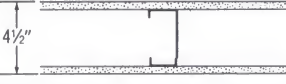
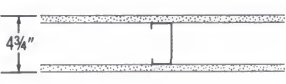
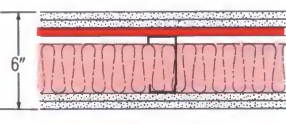
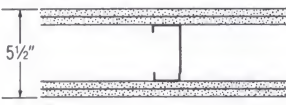
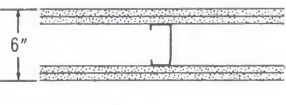

Non-Load Bearing Partitions/Test Data

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2 1/2" studs 24" o.c.—single layer panels ea side appl vert & screw att—1 1/2" THERMAFIBER SAFB—joints fin—perimeter caulked— UL Des U448 wt 5 width 3 1/2"	45 48	TL-69-42 Based on 3 1/2" studs & 2" SAFB— SA-800422	A
1 hr. est		Steel Stud—3/8" SHEETROCK brand gypsum panels, FIRECODE core—2 1/2" studs 24" o.c. 1 1/2" THERMAFIBER SAFB—2 layers—base layer 1/2" SHEETROCK brand gypsum panels screw att—1/2" face layer screw att—joints fin—perimeter caulked—est. fire rating based on T-1174-OSU wt 7 width 4 1/4"	55 53	CK-684-14 Based on 1/2" thick panels— CK-684-13	B
1 hr.		Steel Stud—resil partition—1/2" SHEETROCK brand gypsum panels, FIRECODE core—3 3/8" studs 24" o.c. 1 1/2" THERMAFIBER SAFB 25" wide creased to fit cavity—RC-1 chan 24" o.c. screw att one side—panels vert appl & screw att—joints stag & fin—perimeter caulked— UL Des U451 wt 6 width 5 1/8"	55 54	SA-850415 Based on 1/2" wide SAFB— USG-850409	C
1 hr. est		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—2 1/2" studs 24" o.c.—single layer panels one side appl vert & screw att—1 1/2" THERMAFIBER SAFB—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked—est. fire rating based on T-3362-OSU wt 7 width 4"	50 41	SA-800504 Based on same construction without SAFB— TL-69-148	D
1 hr.		Steel Stud—2 layers 1/2" SHEETROCK brand gypsum panels ea side—1 1/2" studs 24" o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked— U of C 9-21-64 wt 9 width 3 3/8"	54	Based on SHEETROCK brand gypsum panels FIRECODE C core, 2 1/2" studs & 1 1/2" SAFB— CK-654-40	E
1 hr.		Steel Stud—3/8" SHEETROCK brand gypsum panels, FIRECODE core—3 3/8" studs 24" o.c.—single layer panels vert or horiz appl & screw att—joints stag & fin—perimeter caulked— UL Des U465 —based on panels horiz appl— GA-WP-1200 wt 6 width 4 1/4"	40 49 51	USG-860808 Based on 3" SAFB in cavity— SA-870717 Based on FIRECODE C core panels and 3" SAFB 25" wide, creased to fit cavity— TL-90-166	F
1 hr.		Steel Stud—1/2" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" studs 24" o.c.—single layer panels vert appl & screw att 12" o.c.—joints fin—perimeter caulked— U of C 7-31-62 wt 5 width 2 1/2"	38	USG-860809	G
1 hr.		Steel Stud—3/8" SHEETROCK brand gypsum panels, FIRECODE core—2 1/2" studs 24" o.c.—1 1/2" THERMAFIBER SAFB—panels apply horiz & screw att—joints opp—vert joints unfin—horiz joints fin— CEG 8-11-83 —rating also applies to assembly with 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, joints fin— CEG 5-9-84 wt 6 width 3 3/8"	47	SA-831001	H
1 hr.		Steel Stud Chase Wall—3/8" SHEETROCK brand gypsum panels, FIRECODE core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 6 1/2" apart—1/2" gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin— UL Des U420 wt 6 width 10 3/4"	52	Based on 3 3/8" insulation on one side— TL-76-155	I
1 hr. (truss 3 hr.)		Steel Stud—3/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—fireproofed steel truss—2 1/2" studs 24" o.c. in 2 rows spaced 8" apart—1/2" gypsum panel gussets spanning chase att to stud at qtr & ctr points—panels appl vert & screw att—joints stag & fin— UL Des U805 wt 6 width 14 1/4"	N/A		J
2 hr.		Steel Stud—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 3/8", 2 1/2" or 3 3/8" studs 24" o.c.—1", 1 1/2" or 2" THERMAFIBER SAFB stapled—base layer appl vert, face layer appl vert or horiz, joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked—rating based on assembly with or without sound atten blankets— UL Des U412 wt 10 width 4 1/2"	50 55 52	Based on 3 3/8" stud assembly and FIRECODE core panels, without SAFB— USG-840817 Based on 3 3/8" studs and 1 1/2" SAFB— SA-800421 Based on lamin, face layer, 1 1/2" SAFB and 2 1/2" studs— SA-860932 Based on 2 1/2" studs, screw att. face layer and 1 1/2" SAFB— CK-654-40	K
2 hr.		Steel Stud—2 layers 3/8" SHEETROCK brand gypsum panels, FIRECODE core, plain or vinyl faced vert appl ea side—2 1/2" or 3 3/8" studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints stag & fin or unfin—perimeter caulked— UL Des U411 wt 12 width 6 1/4"	48 56	Based on 3 3/8" studs and 3/8" SHEETROCK brand gypsum panels, FIRECODE C core— BBN-770408 Based on 3 3/8" studs and 3" SAFB— USG-840818	L
2 hr.		Steel Stud—2 layers 3/8" SHEETROCK brand gypsum panels, FIRECODE core, ea side—2 1/2" studs 24" o.c.—panels appl horiz & joints stag—base and face layers screw att—joints fin—perimeter caulked— GA-WP-1548 wt 12 width 5"	51 56	Based on 2 1/2" SAFB in cavity— GA-WP-1548 Based on 2" SAFB in cavity— USG-840819	M

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
2 hr.		Steel Stud Chase Wall—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 6 1/4" apart—5/8" gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin— UL Des U420 wt 13 width 12"	52 57	TL-76-162 Based on 3 1/2" insulation one side— TL-76-156	N
2 hr. est		Steel Stud Chase Wall—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 5 3/4" apart—5/8" gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att—1 1/2" THERMAFIBER SAFB—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U412 wt 11 width 11"	55	SA-860907	O
3 hr.		Steel Stud—3 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c.—base layers appl vert—face layer appl horiz—panels screw att with joints stag & fin—perimeter caulked—rating based on assembly with or without SAFB— UL Des U435 wt 13 width 4 3/4"	59	Based on assembly with 1 1/2" SAFB in cavity— SA-830112	P
3 hr.		Steel Stud—3 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c. in 2 rows spaced 3" apart—steel truss member—gypsum panel gussets or steel run braces spanning chase screw att to studs—panels appl vert & screw att—joints stag & fin—2 hr. rating applies with 2 layers panels ea side—1 hr. rating applies with single layer 5/8" panels ea side— UL Des U436 wt 13 width 9 1/4"	N/A		Q
4 hr.		Steel Stud—4 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—1 1/2" studs 24" o.c.—base layers appl vert—face layer appl horiz—panels screw att with joints stag & fin—perimeter caulked—rating based on assembly with or without sound atten fire blankets— UL Des U435 wt 17 width 5 3/4"	62	Based on assembly with 1 1/2" SAFB in cavity— SA-830113	R



Steel stud ST25 will provide above fire and sound ratings.

Load-Bearing Partitions/Test Data

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
45 min.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—panels appl vert & att with 1" Type S-12 screws 12" o.c.—joints fin— load bearing up to 100% allowable stud axial load—UL Des U425	47	Based on engineering evaluation using 3" SAFB in cavity	A
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE core—35SJ20 studs 24" o.c.—panels appl vert & att with 1" Type S-12 screws 12" o.c.—joints fin— load bearing up to 100% allowable stud axial load—UL Des U425	40 41	USG-810519 Based on 2" SAFB in cavity— USG-810518	B
1 hr.		Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—1", 1 1/2", 2", 3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c. screw-att to studs—panels appl vert with joints stag—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joints fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— load bearing up to 100% allowable stud axial load—UL Des U440	61 51	Based on 35SJ16 studs, 5/8" thick panels, lateral bracing and 3" SAFB cavity— SA-830628* Based on 35SJ16 studs and lateral bracing— SA-840715	C
1 1/2 hr.		Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—35SJ20 studs 24" o.c.—panels appl vert—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joints fin— load bearing up to 100% allowable stud axial load—UL Des U425	49 49	Based on 2" SAFB— USG-811009 Based on 2" SAFB and 60SJ20 studs— USG-810940	D
2 hr.		Dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE core—35SJ20 studs 24" o.c.—panels appl vert—base layer att with 1" Type S-12 screws 12" o.c.—face layer att with 1 1/2" Type S-12 screws 12" o.c.—joints fin— load bearing up to 80% allowable stud axial load—UL Des U425	48 49	Based on 2" SAFB in cavity— USG-811006 Based on 2" SAFB and 60SJ20 studs— USG-810937	E
3 hr.		Four layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ea side—35SJ20 studs 24" o.c.—1", 1 1/2", 2" or 3" THERMAFIBER SAFB optional—base layers appl vert with joints stag—base panels att with Type S-12 screws 48" o.c.—face layer appl vert or horiz with 2 3/4" Type S-12 screws 12" o.c. and 1 1/2" Type G screws in panels—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— load bearing up to 100% allowable stud axial load—UL Des U426			F

*Assemblies with RC-1 Resilient Channel require lateral bracing and offer estimated fire rating.

Load-Bearing Exterior Walls/Test Data

Fire rating	Fire-rated construction Detail & physical data	Description	Acoustical performance		System reference
			STC	Description & test no.	
1 hr.		3/4", 20-ga. studs 24" o.c.—1/2" gypsum sheathing—1" extruded polystyrene insulation installed horiz—1/2" cedar plywood exterior—3/8" THERMAFIBER FS-15 insul blks betw studs—3/8" SHEETROCK brand gypsum panels, FIRECODE C core, interior—load bearing up to 60% allowable stud axial load—CEG 11-9-79			A
1 1/2 hr.*		1/2" gypsum sheathing exterior—3/4", 20-ga. studs 24" o.c.—dbl layer 5/8" SHEETROCK brand gypsum panels, FIRECODE core, interior—base layers att with 1" Type S-12 screws 12" o.c.—face layers att with 1 1/4" Type S-12 screws 12" o.c.—load bearing up to 100% allowable stud axial load—UL Des U425			B

*Rating applicable to fire exposure on interior face only.

Steel Framing Tables

Screw locations and spacing—fire-rated steel stud drywall partitions

table 1

Test number	Face layer application			Base layer application			
	Screw		Spacing and location	Screw		Position	Spacing and location
	Length	Type		Length	Type		
U of C 6/15/65	1 1/2"	S	12" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S		12" o.c. to studs at joints and in field, 12" o.c. to runners
UL Des U411-2 hr.	1 1/2"	G	adhesive lamination ⁽¹⁾ and supplementary screws	1"	S		8" o.c. to studs at joints. 12" o.c. to studs in field
UL Des U411-2 hr.	1 1/2"	S	16" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S		16" o.c. to studs at joints and in field
UL Des U412-2 hr.	1 1/2"	G	adhesive strip lamination ⁽¹⁾ and supplementary screws	1"	S		12" o.c. to studs at joints and in field
UL Des U412 U of C 9/21/64	1 1/2"	S	12" o.c. to studs at joints and in field	1"	S		12" o.c. to studs at joints and in field
UL Des U420	1 1/2"	S	8" o.c. to studs at joints 12" o.c. to studs in field	1"	S		8" o.c. to studs at joints 12" o.c. to studs in field
GA-WP-1548	1 1/2"	S	12" o.c. to studs and 24" o.c. to runners	1"	S		24" o.c. to studs at joints and in field
UL Des U435-3 hr. UL Des U435-4 hr.	2 1/4" 2 1/2" 1 1/2"	S S G	12" o.c. to studs 12" o.c. to studs between studs at horizontal joints	1" 1 1/2" 2 1/4"	S S S	1st layer 2nd layer 3rd layer	48" o.c. to studs(2)
UL Des U436-2 hr. UL Des U436-3 hr.	1 1/2" 2 1/4" 1 1/2"	S S G	12" o.c. to studs 12" o.c. to studs 24" o.c. between studs at horizontal joints	1" 1 1/2"	S S	1st layer 2nd layer	12" o.c. to studs
T-3362 OSU	1"	S	12" o.c. to studs at joints and runners, 8" o.c. to studs in field				
T-1174 OSU U of C 7/31/62 GA-WP-1200	1"	S	8" o.c. to studs at joints 12" o.c. to studs in field				
UL Des U451-1 hr.	1"	S	12" o.c. to studs at joints and in field				

(1) Use SHEETROCK Setting-Type (DURABOND) or Lightweight Setting Type (EASY SAND) Joint Compound only. (2) Use 12" o.c. for seismic conditions.

Sound transmission loss—db (non-load bearing partitions)

table 2

System reference (p. 4-5)	Test no.	Method	Band center frequency—Hz																STC
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
R	SA-830113	Lab	41	44	50	55	57	61	61	64	65	67	69	70	66	61	62	64	62
P	SA-830112	Lab	37	39	46	51	55	58	60	61	62	65	67	67	64	58	60	62	59
L	USG-840818	Lab	39	39	44	49	49	54	57	57	59	61	63	63	60	52	53	57	56
M	USG-840819	Lab	38	39	47	51	52	53	57	57	58	61	63	63	57	52	53	56	56
B	CK-684-14	Lab	31	40	41	47	50	53	57	59	60	63	63	62	60	59	61	65	55
O	SA-860907	Lab	34	34	38	44	49	53	57	61	61	64	65	67	67	60	57	61	55
K	SA-800421	Lab	34	36	46	47	51	55	56	56	60	61	60	63	59	52	54	57	55
C	SA-850415	Lab	33	37	44	47	51	55	58	60	63	64	65	65	60	51	52	57	55
C	USG-850409	Lab	33	38	43	48	51	55	59	61	63	65	65	65	57	50	52	55	54
K	SA-860932	Lab	36	34	40	43	47	49	52	53	53	55	57	58	58	56	51	54	52
B	CK-684-13	Lab	29	38	40	46	49	54	56	58	60	62	63	61	62	61	63	64	53
E	CK-654-40	Lab	36	35	37	43	47	51	54	55	57	56	56	59	58	58	56	58	54
M	GA-WP-1548	Lab	36	39	45	47	50	51	50	50	50	50	51	52	51	49	51	54	51
F	TL-85-128	Lab	28	32	38	44	47	51	55	58	59	58	58	57	55	47	48	54	51
D	SA-800504	Lab	31	31	38	43	48	51	53	54	56	58	57	59	54	47	47	50	50
K	USG-840817	Lab	34	32	40	43	42	49	54	53	54	56	59	58	52	47	50	52	50
L	BBN-770408	Lab	34	30	37	41	42	48	51	52	53	54	55	56	46	45	48	52	48
F	SA-870717	Lab	33	31	35	39	43	49	53	55	56	58	59	60	58	48	46	50	49
A	SA-800422	Lab	28	27	37	40	44	48	51	53	56	57	59	60	55	46	45	48	48
H	SA-831001	Lab	25	28	36	42	45	49	52	54	57	60	61	59	49	44	47	51	47
A	TL-69-42	Lab	21	29	32	35	40	45	48	51	53	55	57	58	56	49	42	43	45

Technical Data for Interior and Exterior UNIMAST Steel Framing

Physical and structural properties⁽¹⁾—SJ style stud framing ($F_y=40$ ksi)

table 3

Size, style & ga. ⁽²⁾	Weight ⁽²⁾		Net area ⁽⁴⁾ (in ²)	AET (net effective area) (in ²)	Design steel thickness ⁽⁴⁾ (in)	Allow. bending moment about x axis (K-in)	Lip width (in)	Major axis			Minor axis			Full unreduced section modulus S_x (in ³)	Effective section modulus (M_c/S_x) S_{xc} (in ³)	Q (column factor)	J (in ⁴)	C_w (in ⁶)	X_0 (in)
	(lb/ft)	(kg/m)						I_x (in ⁴)	S_x (in ³)	r_x (in)	I_y (in ⁴)	S_y (in ³)	r_y (in)						
362SJ20	0.97	1.44	0.216	0.2136	0.0359	6.557	0.500	0.541	0.273	1.429	0.085	0.082c	0.621	0.302	0.236	0.752	0.0001	0.300700	1.357
362SJ18	1.24	1.85	0.285	0.2713	0.0478	9.247	0.500	0.708	0.385	1.423	0.111	0.106c	0.616	0.395	0.309	0.799	0.0003	0.387	1.345
362SJ16	1.59	2.37	0.368	0.3341	0.0598	11.678	0.625	0.893	0.486	1.411	0.147	0.146c	0.629	0.499	0.387	0.804	0.0005	0.5703	1.420
362SJ14	2.00	2.98	0.454	0.3917	0.0747	14.293	0.625	1.093	0.596	1.404	0.178	0.176c	0.622	0.611	0.466	0.802	0.0011	0.6833	1.406
40SJ20	1.02	1.52	0.228	0.1792	0.0359	7.464	0.500	0.673	0.311	1.556	0.091	0.084c	0.617	0.341	0.271	0.721	0.0001	0.3631	1.313
40SJ18	1.30	1.93	0.301	0.2576	0.0478	10.5	0.500	0.882	0.437	1.550	0.117	0.108c	0.611	0.447	0.355	0.803	0.0003	0.4679	1.301
40SJ16	1.67	2.48	0.388	0.3571	0.0598	13.302	0.625	1.115	0.554	1.539	0.157	0.150c	0.626	0.566	0.447	0.812	0.0006	0.6816	1.374
40SJ14	2.09	3.11	0.480	0.4833	0.0747	16.3	0.625	1.366	0.679	1.532	0.189	0.181c	0.619	0.693	0.539	0.811	0.0011	0.8176	1.359
60SJ20	1.27	1.89	0.300	0.2148	0.0359	12.93	0.500	1.787	0.539	2.253	0.112	0.088c	0.587	0.596	0.495	0.582	0.0002	0.8744	1.111
60SJ18	1.63	2.43	0.397	0.3107	0.0478	18.561	0.500	2.35	0.773	2.246	0.145	0.118c	0.581	0.785	0.659	0.653	0.0004	1.1309	1.099
60SJ16	2.08	3.10	0.508	0.4303	0.0598	23.759	0.625	2.99	0.99	2.243	0.195	0.163c	0.598	0.999	0.836	0.710	0.0007	1.5888	1.163
60SJ14	2.62	3.90	0.629	0.5858	0.0747	29.231	0.625	3.679	1.218	2.234	0.236	0.197c	0.591	1.229	1.017	0.767	0.0014	1.9148	1.148
725SJ18	1.84	2.74	0.457	0.2969	0.0478	24.361	0.500	3.732	1.015	2.663	0.157	0.118c	0.562	1.029	0.875	0.583	0.0004	1.7311	1.005
725SJ16	2.34	3.48	0.583	0.4304	0.0598	31.268	0.625	4.753	1.303	2.664	0.211	0.166c	0.579	1.311	1.121	0.637	0.0008	2.4067	1.064
725SJ14	2.95	4.39	0.720	0.6152	0.0747	35.529	0.625	5.857	1.605	2.654	0.256	0.203c	0.572	1.615	1.366	0.690	0.0015	2.9054	1.050
80SJ18	1.97	2.93	0.493	0.2937	0.0478	27.874	0.500	4.756	1.161	2.908	0.159	0.118c	0.550	1.187	1.018	0.547	0.0004	2.1644	0.956
80SJ16	2.50	3.72	0.628	0.456	0.0598	36.132	0.625	6.059	1.505	2.911	0.219	0.166c	0.568	1.513	1.306	0.600	0.0009	2.9966	1.013
80SJ14	3.15	4.69	0.779	0.6936	0.0747	44.557	0.625	7.473	1.856	2.901	0.265	0.205c	0.561	1.866	1.594	0.652	0.0017	3.6201	0.999
925SJ16	2.76	4.11	0.702	0.4146	0.0598	44.838	0.625	8.691	1.868	3.316	0.227	0.166c	0.550	1.875	1.647	0.546	0.0009	4.1512	0.938
925SJ14	3.48	5.18	0.872	0.6028	0.0747	55.351	0.625	10.73	2.306	3.306	0.278	0.206c	0.543	2.314	2.015	0.594	0.0018	5.0199	0.925
115SJ16	3.23	4.81	0.837	0.4355	0.0598	55.03	0.625	15.03	2.293	4.030	0.229	0.166c	0.521	2.606	2.326	0.470	0.0011	6.7915	0.830
115SJ14	4.07	6.06	1.040	0.5366	0.0747	77.138	0.625	18.58	3.214	4.018	0.292	0.207c	0.514	3.221	2.853	0.512	0.0021	8.2221	0.818
135SJ14	4.60	6.84	1.189	0.8562	0.0747	90.046	0.625	27.99	3.752	4.639	0.295	0.207c	0.491	4.134	3.704	0.456	0.0024	11.83235	0.743

Conforms to 1986 AISI Specification for the Design of Cold-Formed Steel Structural Members.

(1) Narrower flange is 1.552 in.; wider flange is 1.724 in. outside width for all SJ-style members. (2) Indicates size, style and gauge: 362—3½" (3.573"), 40—4" (3.921"), 60—6" (5.921"), 725—7½" (7.171"), 80—8" (7.921"), 925—9½" (9.171"), 115—11½" (11.421"), 135—13½" (13.421"), SJ—stud/joist, 20—ga. thickness. (3) Steel with corrosion-resistant coating. (4) Steel without coating.

Structural properties—Interior stud framing

table 4

Stud design ⁽¹⁾	I_x (in ⁴)	S_x (in ³)	r_x (in)	I_y (in ⁴)	S_y (in ³)	r_y (in)	M_a (K-in) ⁽²⁾
158ST25	0.038	0.040	0.678	0.018	0.024	0.484	0.795
212ST25	0.101	0.071	1.012	0.019	0.024	0.480	1.393
358ST25	0.239	0.113	1.415	0.019	0.024	0.464	2.234
400ST25	0.302	0.123	1.545	0.019	0.024	0.459	2.441
600ST25	0.773	0.184	2.209	0.019	0.024	0.427	3.633
212ST22	0.155	0.110	1.008	0.032	0.037	0.475	2.187
358ST22	0.367	0.182	1.410	0.033	0.037	0.460	3.606
400ST22	0.463	0.209	1.539	0.033	0.038	0.454	4.133
600ST22	1.224	0.342	2.202	0.034	0.038	0.422	6.762
212ST20	0.175	0.123	1.006	0.039	0.044	0.473	2.706
358ST20	0.414	0.213	1.407	0.045	0.046	0.458	4.698
400ST20	0.523	0.246	1.536	0.046	0.047	0.452	5.423
600ST20	1.385	0.437	2.199	0.051	0.048	0.420	9.642

(1) Indicates size, style and gauge: 158—1½", ST—stud; 20—ga. thickness (see table 7). Yield strength: all styles 33 ksi for ST and 40 ksi for SJ. (2) Effective properties based on AISI Specifications, 1986 edition. (3) Assuming full lateral support. For laterally unbraced structural member, see Section C3.1.2, AISI specifications, 1986 edition.

Structural properties—Steel runners

table 5

Runner ⁽¹⁾ designation	I_x (in ⁴)	S_x (in ³)	r_x (in)	M_a (K-in) ⁽²⁾
158CR25	0.025	0.022	0.663	0.443
212CR25	0.070	0.043	0.992	0.848
358CR25	0.172	0.061	1.366	1.209
400CR25	0.222	0.068	1.488	1.340
600CR25	0.629	0.101	2.115	1.990
212CR22	0.116	0.073	1.035	1.450
358CR22	0.281	0.128	1.417	2.533
400CR22	0.354	0.149	1.541	2.949
600CR22	0.989	0.220	2.185	4.360
212CR20	0.147	0.095	1.007	1.871
358CR20	0.328	0.160	1.416	3.170
400CR20	0.415	0.185	1.541	3.670
600CR20	0.111	0.304	2.183	6.020

(1) Yield strength is 33 ksi. (2) Effective properties based on AISI Specifications, 1986 edition. (3) Assuming full lateral support. For laterally unbraced structural member, see Section C3.1.2, AISI specifications, 1986 edition.

Physical properties—Interior stud framing

table 6

Stud designation	Stud width —in.	(mm)	Net area —in. ⁽²⁾	Approx. wt. ⁽²⁾ lb./ft. (kg/m)
158ST25	1½	41.3	0.085	0.33
212ST25	2½	63.5	0.102	0.38
358ST25	3½	92.1	0.123	0.45
400ST25	4	101.6	0.130	0.48
600ST25	6	152.4	0.167	0.61
158ST22	1½	41.3	0.100	0.45
212ST22	2½	63.5	0.103	0.53
358ST22	3½	92.1	0.135	0.64
400ST22	4	101.6	0.146	0.68
600ST22	6	152.4	0.203	0.88
158ST20	1½	41.3	0.144	0.56
212ST20	2½	63.5	0.173	0.73
358ST20	3½	92.1	0.210	0.85
400ST20	4	101.6	0.223	0.90
600ST20	6	152.4	0.288	1.17

(1) Net area excluding coating, through section at hole. (2) Average shipping weight including coating.

Thickness—Steel studs and runners⁽¹⁾

table 7

Style	Design ⁽²⁾		Minimum		Gauge ⁽³⁾
	in	mm	in	mm	
ST, CR25	0.0188	0.48	0.0179	0.45	25
ST, CR22	0.0284	0.72	0.0270	0.69	22
ST, CR20	0.0329	0.84	0.0312	0.79	20
SJ, JR20	0.0359	0.91	0.0341	0.87	20
SJ, CR18	0.0478	1.21	0.0454	1.15	18
SJ, CS, CR16	0.0598	1.52	0.0568	1.44	16
SJ, CS, CR14	0.0747	1.90	0.0710	1.80	14

(1) Uncoated steel thickness meets ASTM A568. Studs and runners meet ASTM C645. Coatings are galvanized per ASTM A525; aluminum-zinc per ASTM A792; or ASTM A591 (weights equivalent to A525). (2) Conforms to Sec. A3, AISI Specifications for the Design of Cold-Formed Steel Structural Members, 1986 edition. (3) For information only, refer to limiting height and structural properties table for design data.

Limiting heights—Interior stud framing

table 8

Stud design	Stud width	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furring, one layer
25 gauge (.0179 min.)						
158ST25	1½"	16"	L/120 L/240 L/360	10'9" f 9'6" d 8'3" d	10'9" d 10'6" d 9'0" d	10'3" d 8'3" d 7'3" d
		24"	L/120 L/240 L/360	8'9" f 8'3" d 7'3" d	8'9" f 8'9" f 8'0" d	8'9" f 7'3" d 6'3" d
	2½"	16"	L/120 L/240 L/360	13'9" f 12'6" d 10'9" d	13'9" f 13'6" d 11'9" d	13'9" d 11'0" d 9'9" d
		24"	L/120 L/240 L/360	11'3" f 10'9" d 9'6" d	11'3" f 11'3" f 10'3" d	11'3" f 9'9" d 8'6" d
	3½"	16"	L/120 L/240 L/360	16'9" f 16'0" d 14'0" d	16'9" f 16'9" f 14'9" d	16'9" f 14'6" d 12'9" d
		24"	L/120 L/240 L/360	13'6" f 13'6" f 12'3" d	13'6" f 13'6" f 13'0" d	13'6" f 12'9" d 11'0" d
212ST25	2½"	16"	L/120 L/240 L/360	17'3" f 17'3" d 15'0" d	17'3" f 17'3" f 15'9" d	17'3" f 15'9" d 13'9" d
		24"	L/120 L/240 L/360	14'3" f 14'3" f 13'0" d	14'3" f 14'3" f 13'9" d	14'3" f 13'9" d 12'0" d
	4"	16"	L/120 L/240 L/360	20'0" f 20'0" f 20'0" f	20'0" f 20'0" f 20'0" f	20'0" f 20'0" f 18'9" f
		24"	L/120 L/240 L/360	15'0" v 15'0" v 15'0" v	15'0" v 15'0" v 15'0" v	15'0" v 15'0" v 15'0" v
	6"	16"	L/120 L/240 L/360	22'0" f 22'0" f 22'0" f	22'0" f 22'0" f 22'0" f	22'0" f 22'0" f 22'0" f
		24"	L/120 L/240 L/360	19'3" d 19'3" d 19'3" d	19'3" d 19'3" d 19'3" d	19'3" d 19'3" d 19'3" d

22 gauge (.0270 min.)

212ST22	2½"	16"	L/120 L/240 L/360	16'6" d 13'0" d 11'6" d	17'0" f 14'0" d 12'3" d	15'3" d 12'0" d 10'6" d
		24"	L/120 L/240 L/360	14'0" f 11'6" d 10'0" d	14'0" f 12'3" d 10'6" d	13'3" d 10'6" d 9'3" d
	3½"	16"	L/120 L/240 L/360	21'9" d 17'3" d 15'0" d	22'0" f 18'0" d 15'9" d	20'3" d 16'0" d 14'0" d
		24"	L/120 L/240 L/360	18'0" f 15'0" d 13'0" d	18'0" f 15'9" d 13'9" d	17'9" d 14'0" d 12'3" d
	4"	16"	L/120 L/240 L/360	23'3" f 18'6" d 16'3" d	23'3" f 19'3" d 16'9" d	21'9" d 17'3" d 15'0" d
		24"	L/120 L/240 L/360	19'0" f 16'3" d 14'0" d	19'0" f 16'9" d 14'9" d	19'0" f 15'0" d 13'3" d
358ST22	3½"	16"	L/120 L/240 L/360	29'0" f 25'3" d 22'0" d	29'0" f 26'0" d 22'9" d	29'0" f 23'9" d 20'9" d
		24"	L/120 L/240 L/360	23'6" f 22'0" d 19'3" d	23'6" f 22'9" d 19'9" d	23'6" f 20'9" d 18'3" d
	4"	16"	L/120 L/240 L/360	32'11" d 26'1" d 22'10" d	33'11" d 28'6" d 24'11" d	32'3" d 25'6" d 23'3" d
		24"	L/120 L/240 L/360	25'3" f 22'10" d 19'11" d	25'3" f 24'11" d 21'10" d	28'0" d 22'3" d 19'6" d
	6"	16"	L/120 L/240 L/360	32'11" d 26'1" d 22'10" d	33'11" d 28'6" d 24'11" d	32'3" d 25'6" d 23'3" d
		24"	L/120 L/240 L/360	25'3" f 22'10" d 19'11" d	25'3" f 24'11" d 21'10" d	28'0" d 22'3" d 19'6" d

20 gauge (.0312 min.)

212ST20	2½"	16"	L/120 L/240 L/360	17'4" f 13'10" d 12'0" d	17'11" f 16'1" d 14'0" d	16'6" d 13'0" d 11'6" d
		24"	L/120 L/240 L/360	14'7" f 12'0" d 10'6" d	14'7" f 13'5" f 12'4" d	14'6" d 11'6" d 10'0" d
	3½"	16"	L/120 L/240 L/360	22'7" d 17'11" d 15'7" d	23'8" f 20'2" d 17'8" d	21'9" d 17'3" d 15'0" d
		24"	L/120 L/240 L/360	19'4" f 15'7" d 13'8" d	19'4" f 17'8" f 15'6" d	19'0" d 15'0" d 13'3" d
	4"	16"	L/120 L/240 L/360	24'3" d 19'2" d 16'10" d	25'6" d 21'7" d 18'11" d	23'6" d 18'9" d 16'3" d
		24"	L/120 L/240 L/360	20'9" f 16'10" d 14'8" d	20'9" f 18'11" d 16'6" d	20'6" d 16'3" d 14'3" d
358ST20	3½"	16"	L/120 L/240 L/360	32'11" d 26'1" d 22'10" d	33'11" d 28'6" d 24'11" d	32'3" d 25'6" d 23'3" d
		24"	L/120 L/240 L/360	25'3" f 22'10" d 19'11" d	25'3" f 24'11" d 21'10" d	28'0" d 22'3" d 19'6" d
	4"	16"	L/120 L/240 L/360	32'11" d 26'1" d 22'10" d	33'11" d 28'6" d 24'11" d	32'3" d 25'6" d 23'3" d
		24"	L/120 L/240 L/360	25'3" f 22'10" d 19'11" d	25'3" f 24'11" d 21'10" d	28'0" d 22'3" d 19'6" d
	6"	16"	L/120 L/240 L/360	32'11" d 26'1" d 22'10" d	33'11" d 28'6" d 24'11" d	32'3" d 25'6" d 23'3" d
		24"	L/120 L/240 L/360	25'3" f 22'10" d 19'11" d	25'3" f 24'11" d 21'10" d	28'0" d 22'3" d 19'6" d

SJ style (.0341 min.)

362SJ20	3½"	16"	L/120 L/240 L/360	24'0" d 19'0" d 16'9" d	25'0" d 19'9" d 17'3" d	23'0" d 18'3" d 16'0" d
		24"	L/120 L/240 L/360	21'0" d 16'9" d 14'6" d	21'9" d 17'3" d 15'0" d	20'3" d 16'0" d 14'0" d
	4"	16"	L/120 L/240 L/360	25'9" d 20'6" d 18'0" d	26'9" d 21'3" d 18'6" d	24'9" d 19'9" d 17'3" d
		24"	L/120 L/240 L/360	22'6" d 18'0" d 15'9" d	23'3" d 18'6" d 16'3" d	21'6" d 17'3" d 15'0" d
	6"	16"	L/120 L/240 L/360	32'11" d 26'1" d 22'10" d	33'11" d 28'6" d 24'11" d	32'3" d 25'6" d 23'3" d
		24"	L/120 L/240 L/360	25'3" f 22'10" d 19'11" d	25'3" f 24'11" d 21'10" d	28'0" d 22'3" d 19'6" d

Limiting height for ½" or ¾" thick gypsum panels and 5 psf uniform load perpendicular to partition or furring. Use one-layer heights for unbalanced assemblies; use two-layer heights for multi-layer assemblies. For furring, stud attached to top and bottom runners and free-standing up to 12-ft. height. *Studs exceeding 12-ft. height require mid-height anchor to exterior wall (see detail, page 30). Chase wall partitions require vertical cross braces 4 ft. o.c. max. Limiting criteria d—deflection, f—bending stress, V—end-reaction shear. Consult local code authority for limiting criteria.

Limiting heights—Chase wall partitions

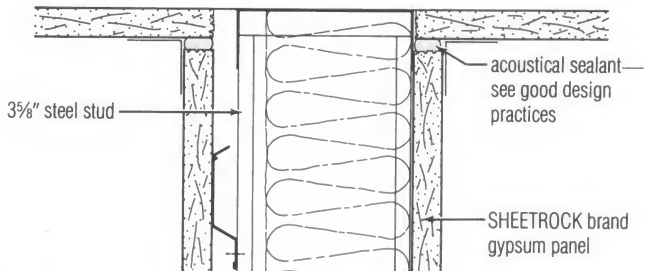
table 9

Stud ga.	Stud width	Stud spacing	Allow. defl.	One layer	Two layers
158ST25	1½"	16"	L/120 L/240 L/360	15'3" f 13'3" d 11'6" d	15'3" f 14'6" d 12'9" d
		24"	L/120 L/240 L/360	12'6" f 11'6" d 10'0" d	12'6" f 12'6" f 11'0" d
	2½"	16"	L/120 L/240 L/360	19'6" f 17'6" d 15'6" d	19'6" f 19'0" d 16'6" d
		24"	L/120 L/240 L/360	16'0" f 15'6" d 13'6" d	16'0" f 16'0" f 14'6" d
	3½"	16"	L/120 L/240 L/360	23'6" f 22'9" d 19'9" d	23'6" f 23'6" f 21'3" d
		24"	L/120 L/240 L/360	19'3" f 19'3" f 17'3" d	19'3" f 19'3" f 18'6" d

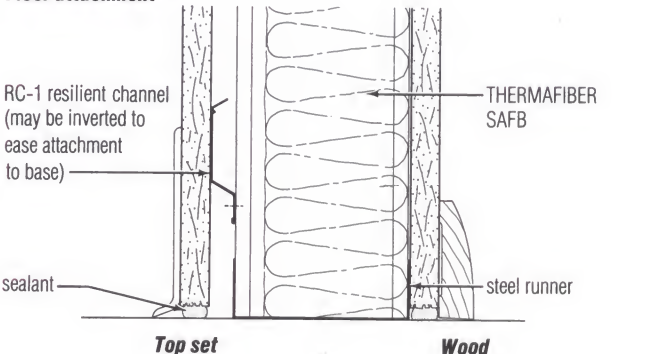
Limiting height for ½" or ¾" thick gypsum panels and 5 psf uniform load perpendicular to partition or furring. Use one-layer heights for unbalanced assemblies; use two-layer heights for multi-layer assemblies. For furring, stud attached to top and bottom runners and free-standing up to 12-ft. height. Chase wall partitions require vertical cross braces 4 ft. o.c. max. Limiting criteria d—deflection, f—bending stress, V—end-reaction shear. Consult local code authority for limiting criteria.

Ceiling attachment

scale: 3" = 1'-0"

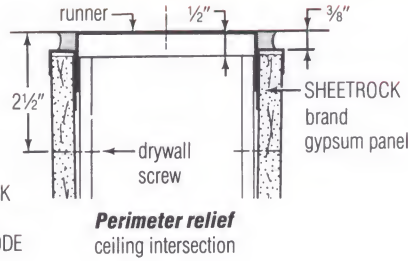
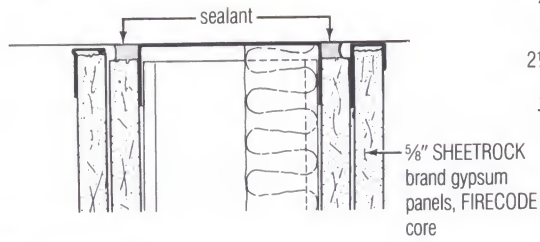


Floor attachment

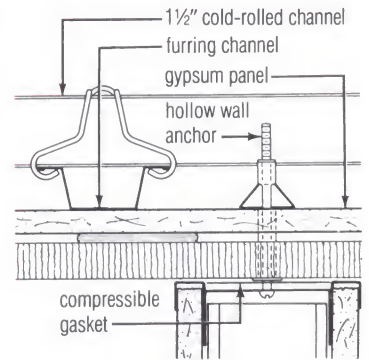


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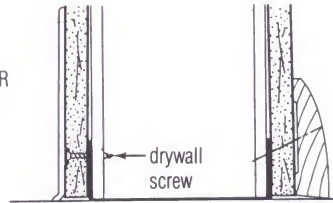
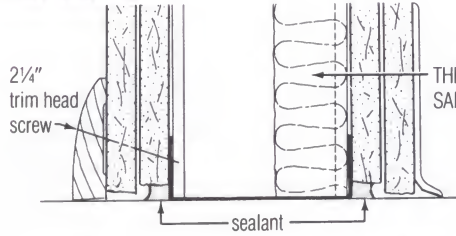
Ceiling attachment



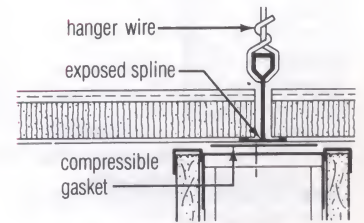
Attachment of partition to ceiling



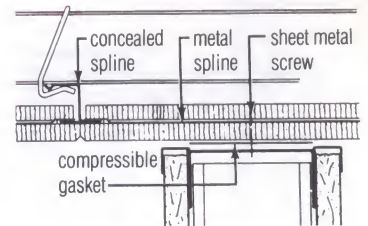
Floor attachment



Adhesively applied acoustical tile



Exposed grid system for acoustical tile and board



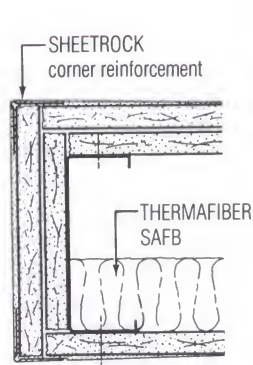
Concealed grid system for acoustical tile

Wood

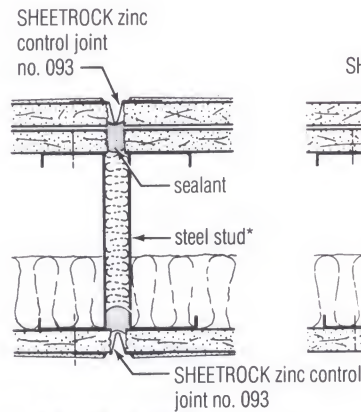
Top set

Top set

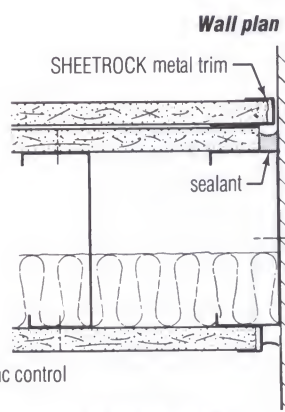
Wood



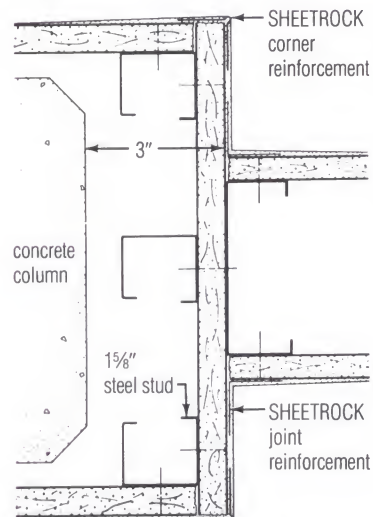
Partition terminal



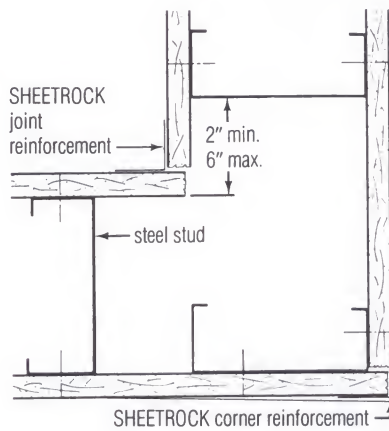
Wall control joint



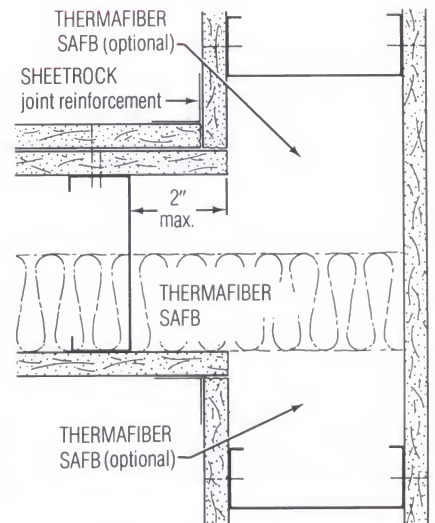
Perimeter relief wall intersection



Partition relief column intersection



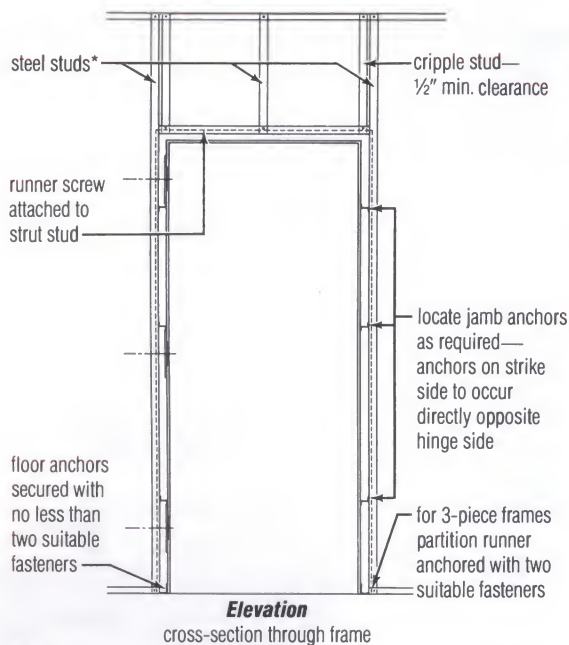
Partition corner



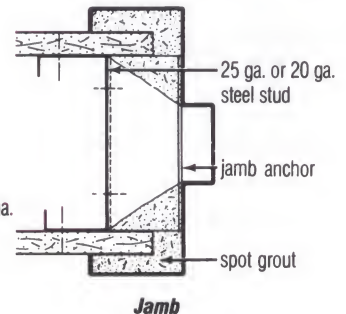
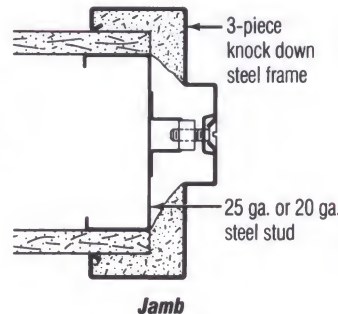
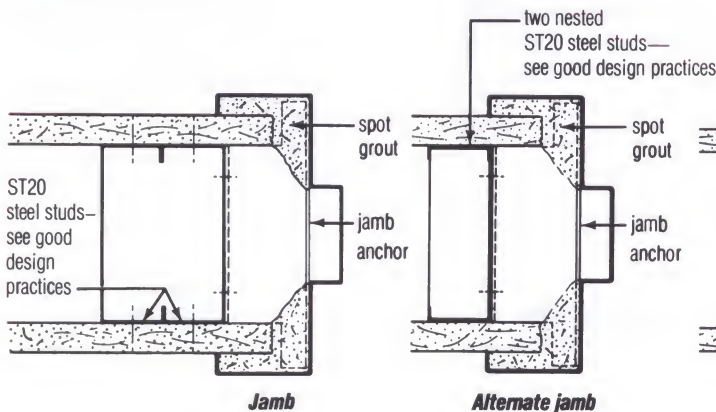
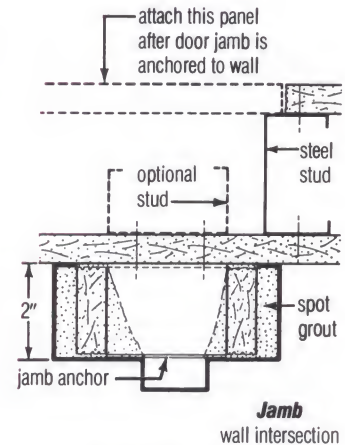
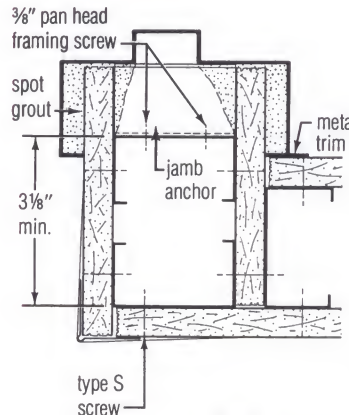
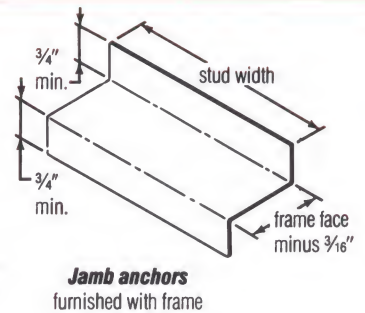
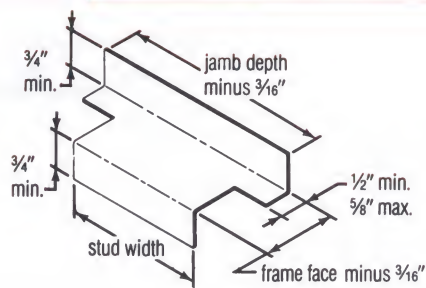
Sound-isolating partition intersection

* All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Door Frames and Control Joints



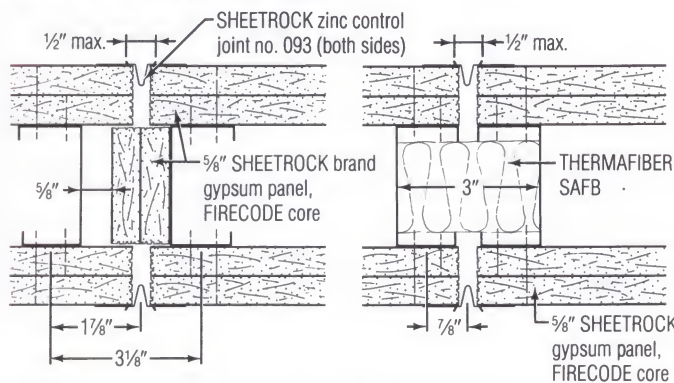
Note: In long runs treat window openings in same manner as doors



Fire-Rated Control Joints

(WHI-495-PSV-0824, 0824A)

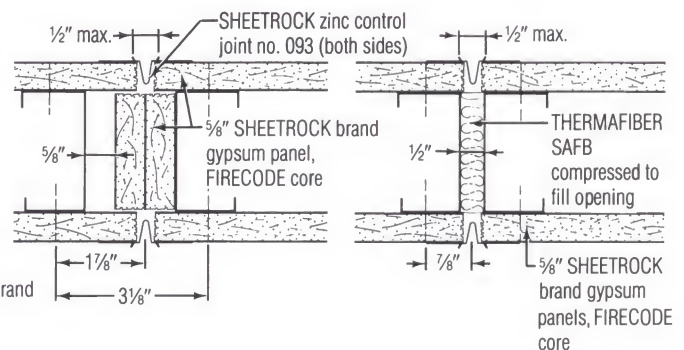
Two-hour rated steel stud partitions



47STC SA-860302

47STC SA-860217

One-hour rated steel stud partition



*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Steel Stud Chase Wall

Chase walls provide vertical shafts where greater core widths are needed for pipe chase enclosures and other service installations. They consist of a double row of steel studs with gypsum panel cross braces between rows. Double-layer $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels are screw-applied on both sides of studs and $\frac{1}{2}$ " THERMAFIBER SAFB are stapled to the back side of one base layer. The assembly offers 55 STC, suitable for party walls, and a 2-hour fire-resistance rating when $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, are used.

As an alternate, $2\frac{1}{2}$ " steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24" o.c. are anchored to horizontal $2\frac{1}{2}$ " runners screw-attached to chase wall studs.

Limiting thickness is max. 24" with gypsum board braces; brace spacing 48" o.c. max. vertically; limiting heights are shown on page 8. Other chase walls providing greater height may be constructed with wider or heavier steel studs (see tables, page 7, for design data).

Resilient Channel Partitions

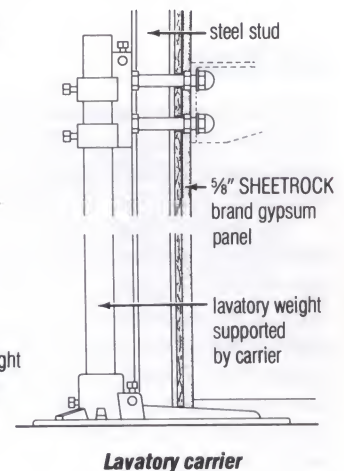
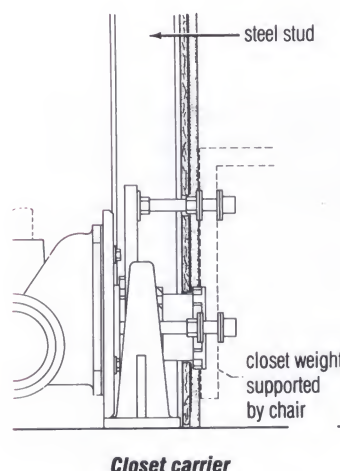
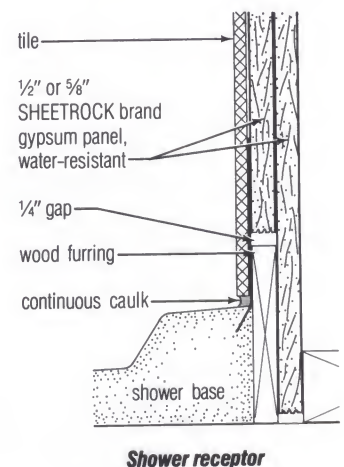
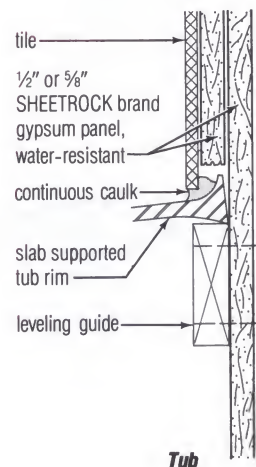
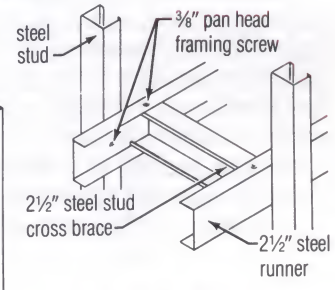
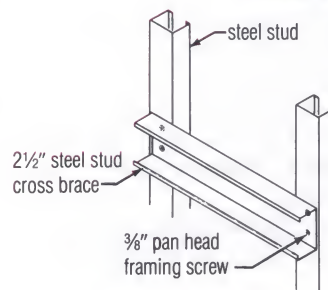
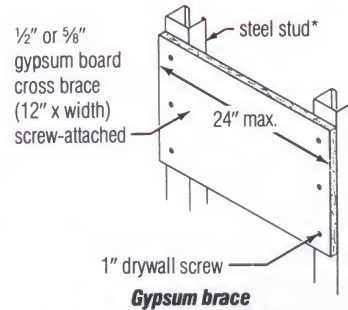
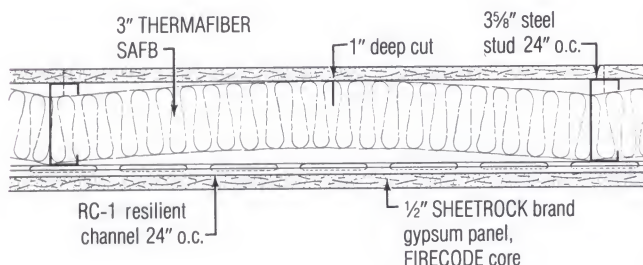
Resilient attachment of gypsum panels with RC-1 Resilient Channels provides low-cost, highly efficient assemblies for increased privacy in corridor and party wall applications. The steel channels float the panels away from the studs and provide a spring action that decouples the board from the framing. When combined with THERMAFIBER SAFB in the framing cavity, highly effective sound attenuation is obtained.

In these thin, lightweight assemblies, horizontal RC-1 Resilient Channels, 24" o.c., are screw-attached one side of $3\frac{1}{8}$ " steel studs spaced 24" o.c. and set in runners. Gypsum panels are screw-attached to these channels on one side and directly attached to the steel stud flanges on the opposite partition side. THERMAFIBER SAFB, 3" thick and 25" wide, are inserted and creased in the partition cavity. Because the blanket is wider than the cavity, it presses against the panels, thereby damping sound vibrations more effectively and offering 55 STC sound rating. (Use of a filler strip at the base may reduce STC rating.) Limiting heights for these assemblies are shown in the table below.

Limiting heights—resilient channel assemblies⁽¹⁾

Stud desig.	Stud width	Stud spacing	Allow. def.	One layer resilient partition
358ST25	3"	16"	L/120 L/240	16'7"t 13'4"d
		24"	L/120 L/240	13'6"t 11'8"d

(1) Limiting height for $\frac{1}{2}$ " thick gypsum panels and 5-psf uniform load perpendicular to partition. Studs attached to top and bottom runners on resilient side. Limiting criteria: d—deflection, t—bending stress; consult local code authority for limiting criteria.



Curved Drywall Partitions

Curved partitions are an attractive way to soften the hard lines of flat wall dimensions. They create a flowing dimension that offsets the rigidity of flat wall lines, add appealing depth, and enhance overall decor. Versatile SHEETROCK brand Gypsum Panels can be formed to almost any cylindrically curved surface. In addition, using SHEETROCK brand Gypsum Panels, FIRECODE C Core, will permit 1-hour to 4-hour fire-resistance ratings.

Gypsum panels are applied either dry or wet depending on the radius of curvature desired. To prevent flat areas between framing, shorter bend radii require closer than normal stud spacing.

Panels are horizontally applied, gently bent around framing and securely fastened to achieve the desired radius. When panels are applied dry, the minimum radius of curvature meets many applications (see table for dry gypsum panels). By moistening the face or back paper thoroughly prior to application and replacing the panels in a stack for at least one hour, the panels can be bent to still shorter radii (see table for wetted panels). When panels dry thoroughly, they regain original hardness.

Cutouts for electrical boxes are not recommended in curved surfaces unless they can be made after boards are installed and thoroughly dry.

Minimum bending radii of dry gypsum panel

Panel thickness		Panel applied with long dimension perpendicular to framing		Panel applied with long dimension parallel to framing	
in	mm	ft	m	ft	m
1/4	6.4	5	1.5	15	4.6
5/8	9.5	7 1/2	2.3	25	7.6
1/2	12.7	20 ⁽¹⁾	6.1	—	—

(1) Bending two 1/4" pieces successively permits radii shown for 1/2" gypsum panels.

Minimum bending radii of wetted gypsum panel⁽¹⁾

Panel thickness	Radius	Inside length of arc ⁽²⁾	Outside length of arc ⁽²⁾	No. of studs on arc including those at tangents ⁽³⁾	Approximate stud spacing c. to c. ⁽⁴⁾	Maximum stud spacing ⁽⁴⁾	Ounces of water required per panel side ⁽⁵⁾
1/4"	2'0"	3.14'	44.0"	9	5.50"	6"	30
1/4"	2'6"	3.93'	53.4"	10	5.93"	6"	30
5/8"	3'0"	4.71'	62.8"	9	7.85"	8"	35
5/8"	3'6"	5.50'	72.2"	11	7.22"	8"	35
1/2"	4'0"	6.28'	81.6"	8	11.70"	12"	45
1/2"	4'6"	7.07'	91.1"	9	11.40"	12"	45

(1) For gypsum board applied horizontally to a 4" thick partition.

(2) Arc length = $\frac{3.14 \cdot R}{2}$ (for a 90° arc)

(3) No. studs = outside arc length/maximum spacing + 1 (rounded up to next whole number).

(4) Stud spacing = outside arc length/no. of studs - 1 (measured along outside of runner).

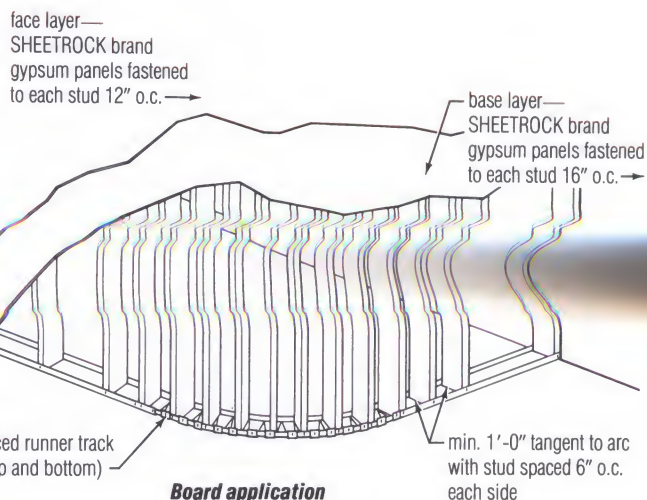
(5) Wet only the side of panel that will be in tension. Water required per panel side is based on a 4'x8' panel.

Tall Walls

Partitions exceeding about 30' in height are considered tall. When these taller than normal partition heights are required, consideration must be given to length restrictions for manufacturing and shipping steel studs, scaffolding, stud placement, etc.

Use double SJ studs back-to-back 24" o.c. The studs should be the maximum practical length so that the splice of one stud in each pair will occur at outer 1/4 of the span. The splice of the other stud will occur at the opposite end. Attach studs back to back with screws approximately 4' o.c. Attach each stud flange to top and bottom runner with 1/2" Type S-12 screws so that each pair of studs will have four screw attachments at each end. Attach 1 1/2" 20 ga. V-bracing to stud flanges on each side approximately 12' o.c. for stud alignment and lateral bracing. Refer to SA-921 for additional information.

For 5 psf wind load, 20 ga. runner track is recommended. The fasteners should have a capacity of 300-lb. in single shear and



spliced runner track
(top and bottom)

Board application

min. 1'-0" tangent to arc
with stud spaced 6" o.c.
each side

bearing. For 10 psf wind load, 18 ga. runner track attached with fasteners with 400-lb. single shear and bearing is recommended.

Runner Attachment Spacing

Maximum wall height	Wind load	
	5 psf	10 psf
40'	24"	24"
48'	24"	20"
55'	24"	16"

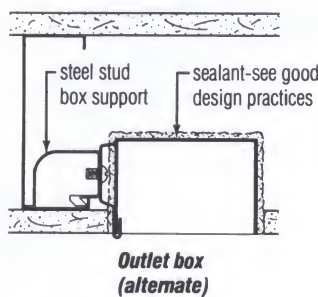
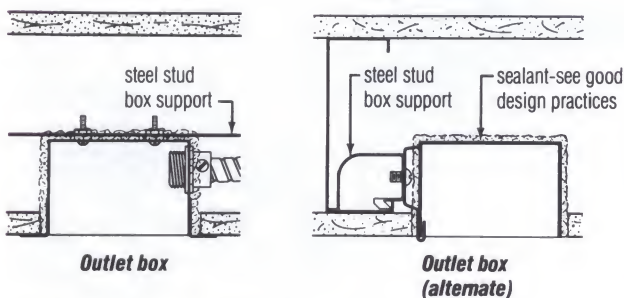
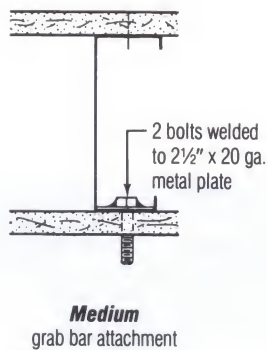
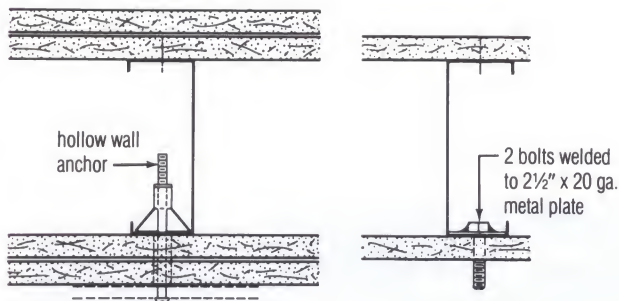
Required Double Stud Sizes

Maximum Wall height	Wind load/deflection			
	5 psf		10 psf	
	L/240	L/360	L/240	L/360
35'	60SJ14 or 725SJ18	725SJ14 or 80SJ16	80SJ14 or 925SJ16	925SJ14 or 115SJ16
40'	725SJ14 or 80SJ16	80SJ14	925SJ14 or 115SJ16	115SJ16
45'	80SJ14	925SJ14	115SJ16	135SJ14
50'	925SJ14	115SJ16	115SJ14	135SJ14
55'	115SJ16	115SJ14	135SJ15	—

Fixture attachment load table

Fastener	Size		Base assembly	Allowable withdrawal resistance		Allowable shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
toggle bolt or hollow wall anchor	3/8	3.18	1/2" gypsum panel	20	89	40	178
	1/2	4.76		30	133	50	222
	5/8	6.35		40	178	60	267
	3/4	3.18	1/2" gypsum panel & ST25 steel stud	70	311	100	445
	1/2	4.76		80	356	125	556
	5/8	6.35		155	689	175	778
no. 8 sheet metal screw			1/2" gypsum panel & ST25 steel stud or 25-ga. steel insert	50	222	80	356
Type S bugle head screw				60	267	100	445
Type S-12 bugle head screw			1/2" gypsum panel & ST20 steel stud or 20-ga. steel insert	85	378	135	600
3/8" Type S pan head screw			25-ga. steel to 25-ga. steel	70	311	120	534
Type S-12			20-ga. steel to 20-ga. steel	53	235	133	591
two bolts welded to steel insert	3/8	4.76	see grab bar attachment below	175	778	200	890
	1/2	6.35		200	890	250	1112
bolt welded to 1 1/2" chan.	1/2	6.35	see plumber's bracket below	200	890	250	1112

(1) Newtons



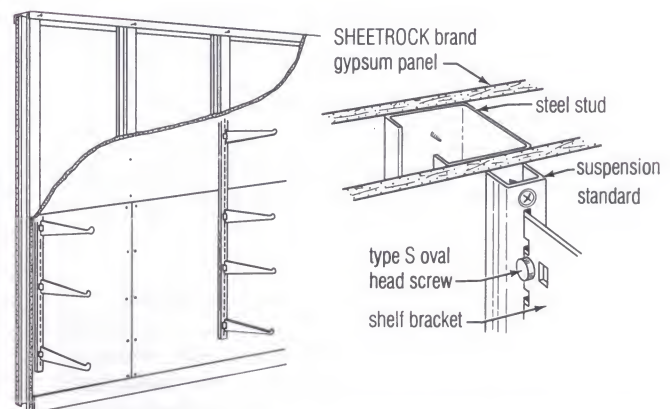
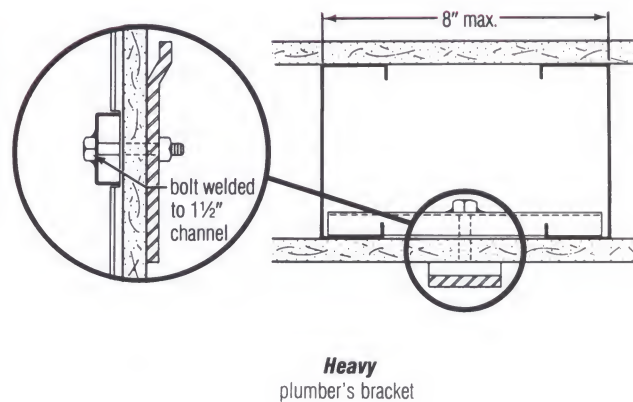
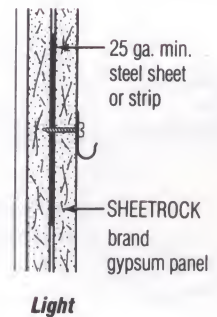
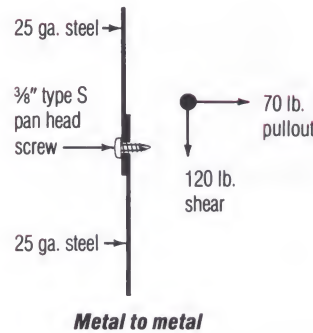
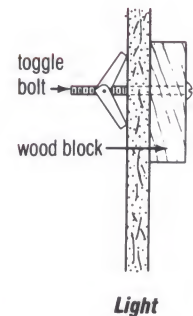
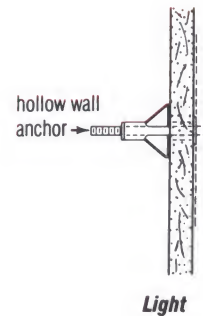
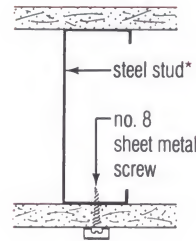
Shelf-Wall System

This system provides load-carrying walls for shelving in stores, offices, schools and other applications. Incorporating simple, quickly erected, economical steel stud components with Garcy shelf brackets, standards and accessories, the assembly offers advantages of steel stud-drywall construction plus structural strength to support shelving and merchandise.

In this assembly, 3 1/2" steel studs spaced no more than 24" o.c. are securely fastened to floor and ceiling runners and surfaced with either single or double-layer SHEETROCK brand Gypsum Panels. Slotted standards are screw-fitted to studs or steel reinforcing inserted between layers.

The system provides a load-carrying partition but is not structurally load-bearing. Limiting height: 16'.

scale: 3" = 1'-0"



*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Drywall Soffits

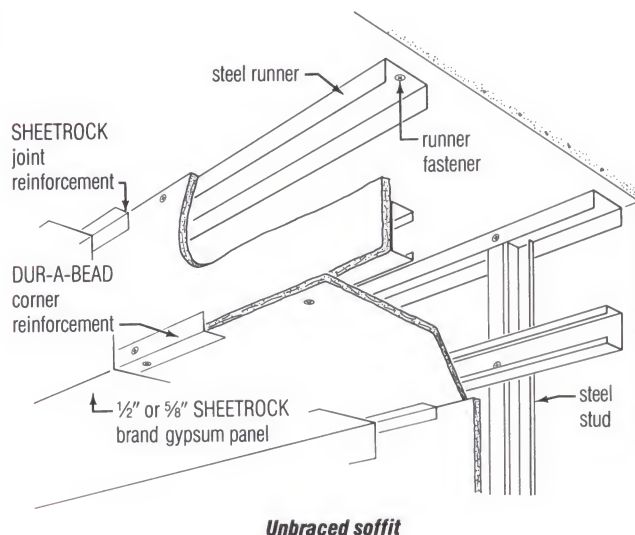
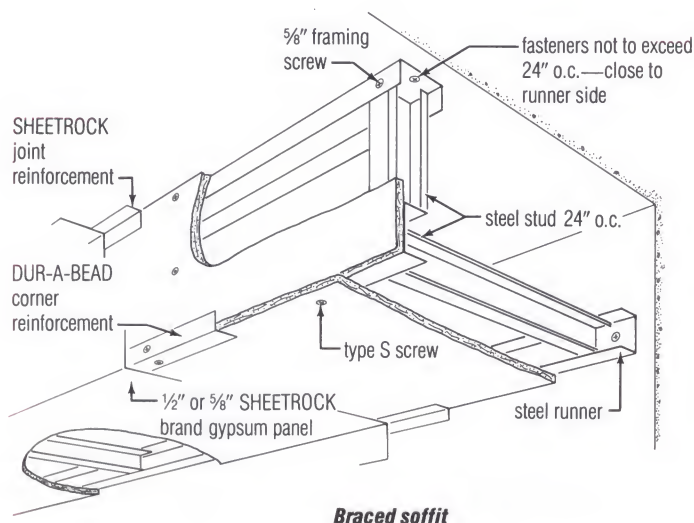
This assembly consists of galvanized steel channel runners and studs faced with SHEETROCK brand Gypsum Panels, screw attached. It is a lightweight, fast and economical method of filling over cabinets or lockers and of housing overhead ducts, pipes or conduits. The braced system permits constructing soffits with depths of 48" (vertically) and widths to 72" (horizontally). The unbraced system is for soffits up to 24"x24".

Maximum width and depth dimensions⁽¹⁾

Gypsum board thickness ⁽²⁾		UNIMAST steel stud size		Maximum width		Max. depth for max. width shown	
in	mm	in	mm	in	mm	in	mm
1/2	12.7	1 1/2	41.3	60	1500	48	1200
1/2	12.7	2 1/2, 3	63.5, 92.1	72	1800	36	900
5/8	15.9	1 1/2	41.3	60	1500	30	800
5/8	15.9	2 1/2, 3	63.5, 92.1	72	1800	18	500

(1) The construction is not designed to support loads other than its own dead weight and should not be used where it may be subjected to excessive abuse.

(2) Double-layer system and 3/8-in. thick gypsum panels are not recommended for this construction.



Floor/Ceilings

These floor/ceilings consist of SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to UNIMAST Metal Furring Channels clipped or wire-tied to suspended runner channels or wire-tied to supports. Or panels may also be screw-attached below a direct suspension system. And for long spans to accommodate large ducts or pipes in the ceiling space, the steel stud is used as ceiling furring or in a separate system (see page 18.)

The steel stud framing system is ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above; accommodates light troffers, ducting and electrical services.

Gypsum panels for these assemblies are available in 1/2" and 5/8" thicknesses and in five types (see Specifications, page 34). SHEETROCK brand Gypsum Panels, Foil-Back, offer an effective vapor retarder, when appropriately sealed as determined by the architect and when installed in a workmanlike manner. Regular gypsum panels provide a firm base for acoustical tile adhesively applied. SHEETROCK brand Exterior Gypsum Ceiling Board is suitable for exterior ceilings and soffits with indirect weather exposure.

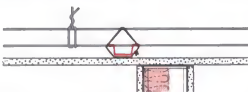
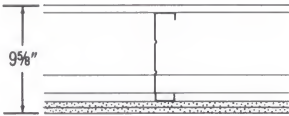
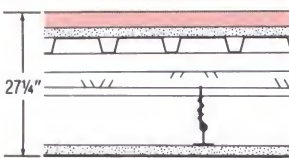
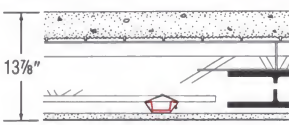
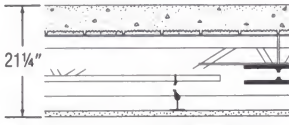
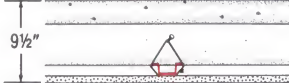
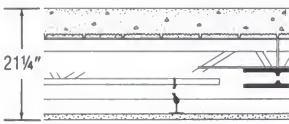
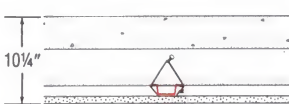
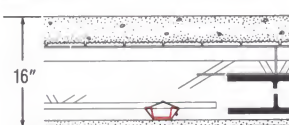
When water-based spray texture paint will be applied, 1/2" SHEETROCK brand Interior Gypsum Ceiling Board is ideal because it supports both the sprayed texture and insulation like 5/8" thick panels but at less cost.

Limitations

Steel studs are not designed to carry live loads, mechanical equipment or material storage. Maximum spacing: 1 1/2" cold-rolled channels and hangers 48" o.c. For single-layer panels, maximum steel stud and furring channel spacing is 24" o.c. for perpendicular application and 16" o.c. for parallel application. For panels used as base for spray-applied texture finish, maximum frame spacing is 16" o.c. for 1/2" thick panels perpendicularly applied; parallel panel application not recommended.




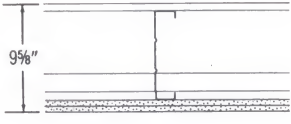
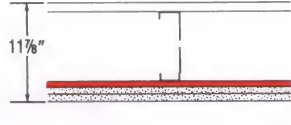
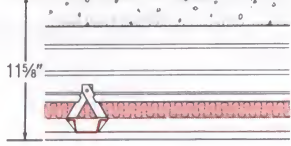

Non-Load Bearing Ceilings/Test Data

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
N/A		1/2" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" cr chan 4" o.c.—met fur chan 24" o.c.—panels screw att 12" o.c.—joints fin clg wt 3	N/A			A
1 hr. (beam 1 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joists 24" o.c.—dbl layer gypsum panel clg and 3/4" T&G plywd flr att to joists with Type S-12 screws—dbl layer gypsum panels around beam—joints exp—UL Des L524 clg wt 4	39 43 56 60		Based on 95SJ16 joists— USG-760105 Based on 95SJ16 joists and 3" SAFB*— USG-760310 Based on 95SJ16 joists and carpet & pad— USG-760106 Based on 95SJ16 joists and carpet & pad with 3" SAFB*— USG-760405	B
1 1/2 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4" o.c. and cross tees 2" o.c.—gypsum panels screw-att below grid—joints stag and fin—min 1" roof insul and 3/4" gypsum bd on steel deck over bar joists—1-hr. rating based on assembly with 3/4" thick panels—UL Des P510 clg wt 4	N/A			C
2 hr. (beam 2 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—furred or susp—met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—2 1/2" conc on riblath or corrugated steel deck over bar joist—UL Des G515 clg wt 3	N/A			D
2 hr. (beam 3 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4" o.c. and cross tees 2" o.c.—gypsum panels screw-att below grid—joints fin—2 1/2" conc on riblath over bar joist—UL Des G529 clg wt 3	N/A			E
2 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws—joints fin—2" prestressed reg or lightwt conc units with 6" deep stems 48" o.c.—UL Des J502—UL Des J503 clg wt 3	N/A			F
3 hr. (beam 3 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—susp grid with main run 4" o.c. and cross tees 2" o.c.—gypsum panels screw-att below grid—joints fin—3 1/4" conc on riblath over bar joist—rating also applies with 3/4" panels and 2 1/2" conc slab—UL Des G529 clg wt 3	N/A			G
3 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws—joints fin—2" prestressed 2 1/2" reg or 2 1/2" lightwt conc units with 6" deep stems 48" o.c.—UL Des J504—UL Des J502—UL Des J503—UL Des J504 clg wt 3	N/A			H
3 hr. (beam 3 hr.)		1/2" SHEETROCK brand gypsum panels, FIRECODE C core—met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—3" conc on corrugated steel deck or on riblath over bar joist—UL Des G512 clg wt 3	N/A			I

*Insulation may affect fire rating. See SA-905.

 Sound-deadening material

Load-Bearing Ceilings/Test Data

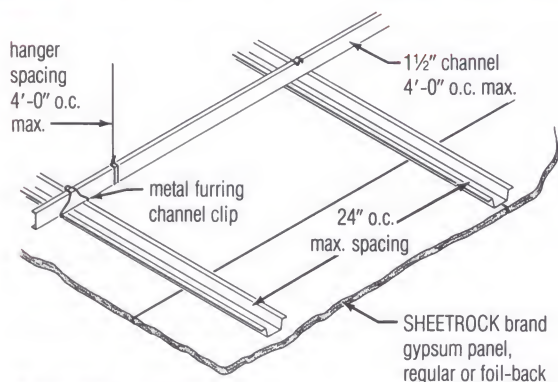
Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance			System reference
			STC	IIC	Description & test no.	
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joists 24" o.c.—2 1/2" conc flr on corrug steel deck—gypsum panel ceiling att to joists with 1" Type S-12 screws 12" o.c.—joints fin—est. fire rating based on witnessed laboratory test	45	70	Based on RC-1 resil chan 24" o.c.— KAL-443536 Based on carpet & pad— KAL-443535	A
1 hr. (beam 1 hr.)		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joists 24" o.c.—2 1/2" T&G plywd flr att to joists with Type S-12 screws 6" o.c. around perim., 10" o.c. in field—dbl layer gypsum panel clg and dbl layer gypsum panels around beam—joints exp—includes unrestrained beam— UL Des L524	39 43	56 60	Based on 95SJ16 joists— USG-760105 Based on 95SJ16 joists and 3" SAFF— USG-760310 Based on 95SJ16 joists and carpet & pad— USG-760106 Based on 95SJ16 joists and carpet & pad with 3" SAFF— USG-760405	B
1 1/2 hr.		Resilient 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—95SJ16 steel joists 24" o.c.—2 1/2" T&G plywd flr att to joists with Type S-12 screws 24" o.c.—dbl layer gypsum panel clg att to RC-1 chan screw att to joists 16" o.c.—base panels att with 1" Type S screws 24" o.c.—face panels att with 1 1/2" Type G screws 8" o.c. at butt joints, 1 1/2" Type S screws 12" o.c. in field—joints fin— UL Des L527	48 51		USG-771101 Based on carpet & pad— SA-781110	C
2 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joists 24" o.c.—2" conc flr on corrug steel deck—met fur chan 24" o.c. clip-att to joist—1" THERMAFIBER insul laid over chan below joists—panels screw-att to chan 12" o.c.—joints fin— UL Des G533				D
2 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core—725SJ18 steel joists 24" o.c.—2 1/2" conc flr over corrug steel deck—dbl layer gypsum panel ceiling—base panels att with 1" Type S-12 screws 12" o.c.—face panels att with 1 1/2" Type S-12 screws 12" o.c.—joints stag and fin—est. fire rating based on witnessed laboratory test	44 73 47		KAL-443533 Based on carpet & pad— KAL-443680 Based on RC-1 resil chan 24" o.c.— KAL-443534	E

†Fire ratings apply when assemblies are constructed with framing members having heavier gauge and/or larger dimensions.

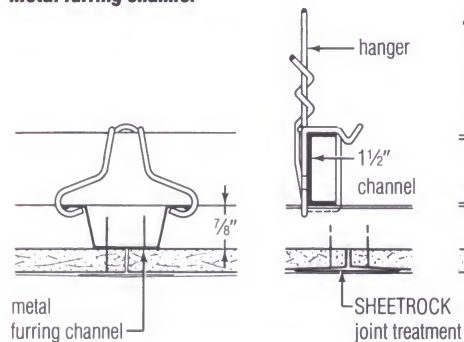
*Insulation may affect fire rating.

THERMAFIBER Insulation

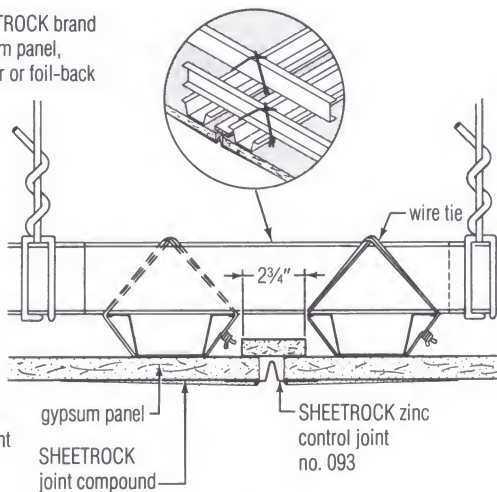
RC-1™ Resilient Channel



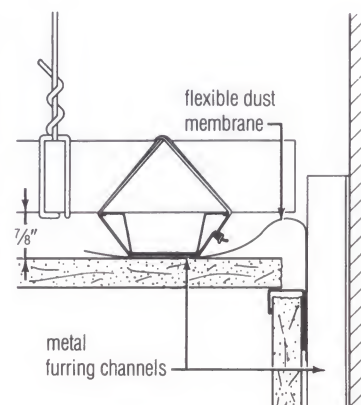
Metal furring channel



Grillage suspension



Control joint



Wall intersection

Limiting spans of UNIMAST Metal Furring Channels Between Structural Supports⁽¹⁾

(Limiting Span Between 1 1/2" Channel is 4'0" o.c. max.)

Type furring member	Member spacing (in. o.c.)	Single layer panels (2.5 psf max.)		Double layer panels (5.0 psf max.)	
		1-span	3-span	1-span	3-span
DWC-25 (hemmed)	16	5'9"	7'1"	4'7"	5'8"
	24	5'0"	6'2"	4'0"	4'11"
DWC-20 (unhemmed)	16	6'11"	8'6"	5'5"	6'9"
	24	6'0"	7'5"	4'9"	5'11"

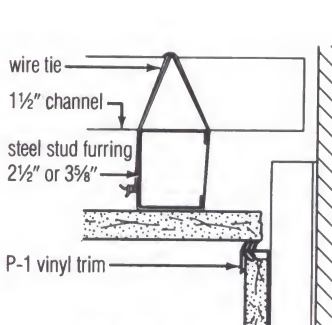
(1) Limiting spans for 1/2" and 3/4" thick panels, max. L/240 deflection and uniform load shown. Investigate concentrated loads such as light fixtures and exhaust fans separately.

scale: 3" = 1'-0"

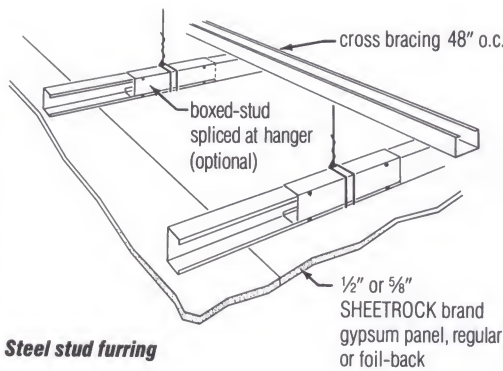
Limiting spans—UNIMAST Steel Stud ceiling system⁽¹⁾

Stud style	212ST25			358ST25 ⁽²⁾			400ST25 ⁽²⁾			212ST20			358ST20			400ST20			600ST20			
Stud spacing-in.	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	
Single span																						
Uniform load —psf	5	10'11"	9'11"	8'8"	14'7"	13'3"	11'7"	15'9"	14'4"	12'6"	13'2"	11'11"	10'5"	17'6"	15'11"	13'11"	19'0"	17'3"	15'0"	26'3"	23'10"	20'10"
	10	8'8"	7'11"	6'9"	11'7"	10'6"	7'3"	12'6"	11'0"	9'0"	10'5"	9'6"	8'3"	13'11"	12'8"	11'0"	15'0"	13'8"	11'11"	20'10"	18'11"	16'6"
	15	7'7"	6'10"	4'9"	9'8"	7'3"	4'9"	10'4"	9'0"	6'8"	9'1"	8'3"	7'3"	12'2"	11'0"	9'8"	13'2"	11'11"	10'4"	18'2"	16'6"	13'11"
	20	6'9"	5'4"	—	7'3"	5'5"	—	9'0"	7'6"	5'0"	8'3"	7'6"	6'4"	11'0"	10'0"	8'4"	11'11"	10'10"	9'0"	16'6"	14'9"	12'0"
Double and triple span																						
Uniform load —psf	5	13'6"	12'4"	10'2"	17'5"	14'8"	11'2"	17'6"	14'7"	11'0"	16'4"	14'10"	12'11"	21'9"	19'9"	17'8"	23'6"	21'4"	18'8"	32'6"	29'6"	25'9"
	10	10'2"	8'8"	6'11"	11'2"	9'2"	6'8"	11'0"	8'9"	6'3"	12'11"	11'9"	10'1"	17'3"	15'8"	13'3"	18'8"	16'11"	14'3"	25'9"	21'10"	16'10"
	15	8'2"	6'11"	5'9"	8'4"	6'8"	4'9"	8'0"	6'3"	4'4"	11'4"	10'0"	8'2"	15'0"	13'3"	10'10"	16'3"	14'3"	11'7"	20'3"	16'10"	13'10"
	20	6'11"	5'9"	4'4"	6'8"	5'3"	—	6'3"	4'10"	—	10'0"	8'9"	7'1"	13'3"	11'6"	9'4"	14'3"	12'4"	9'9"	16'10"	13'10"	10'2"

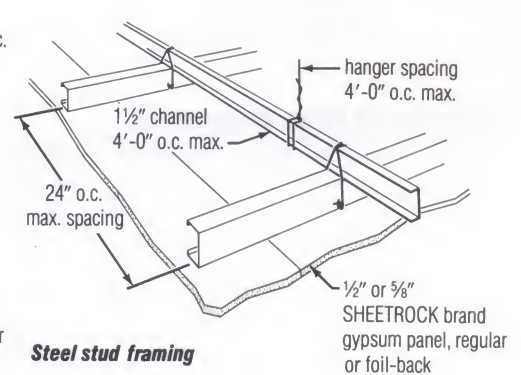
(1) Based on L/240 allowable deflection. Bracing of top flanges is required and must not exceed 48" o.c. (2) Stud end stiffening required. Additional hangers are necessary when span area exceeds 16 ft².



Wall intersection

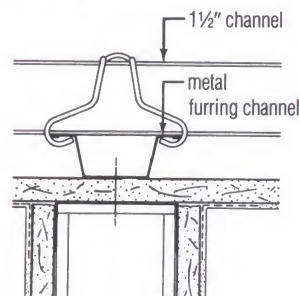


Steel stud furring

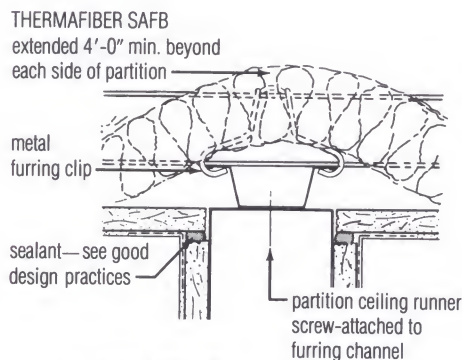


Steel stud framing

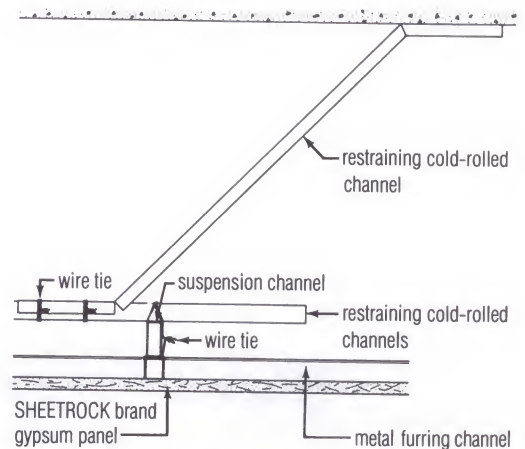
Partition attachment at ceiling



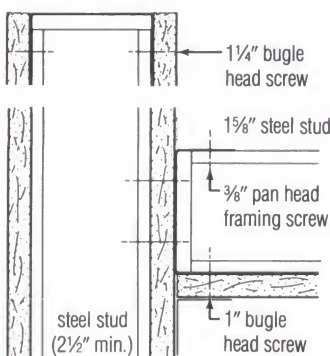
Continuous ceiling



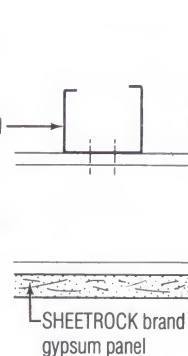
Sound isolating interrupted ceiling



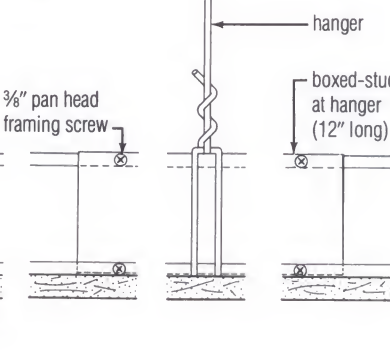
Optional bracing for lateral ceiling loads



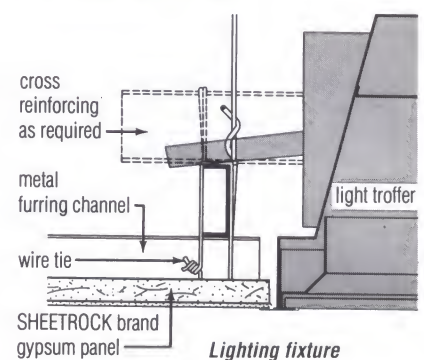
Partition attachment



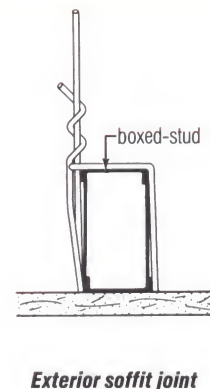
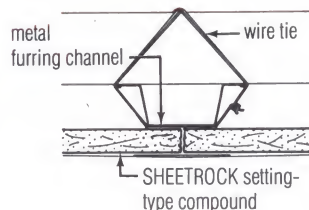
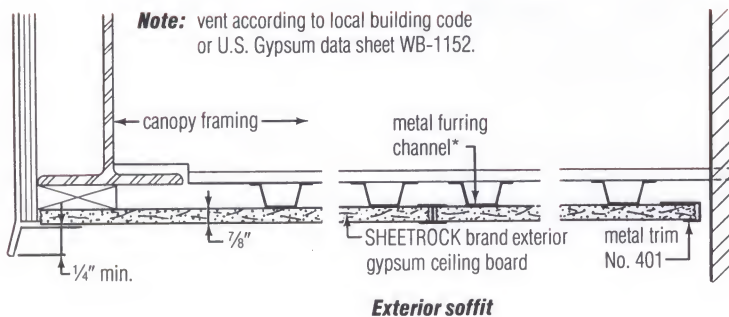
Cross bracing



Hanger attachment



Lighting fixture

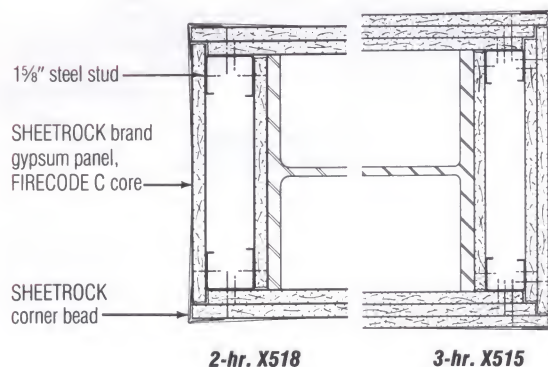
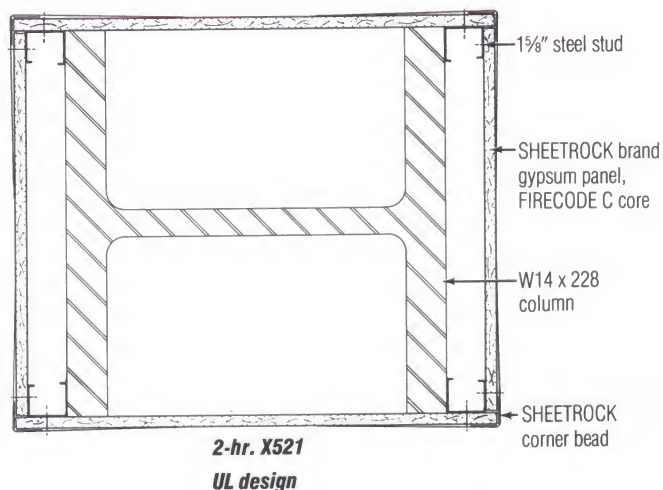


Column and Beam Fireproofing

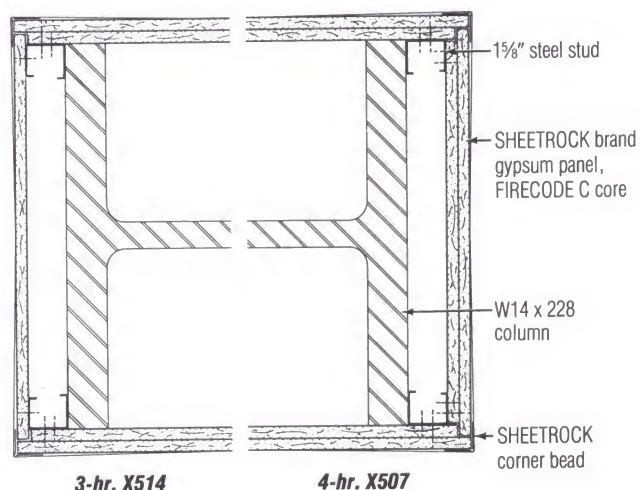
Drywall systems for column fireproofing consist of SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to 1 1/8" steel studs at column corners. DUR-A-BEAD or No. 800 Corner Bead concealed with a United States Gypsum Company joint compound resists damage from impact at exterior corners.

These systems are easily and quickly installed without waiting for adhesives to dry. They provide lightweight, thin, compact steel column fire protection of up to four hours depending on the construction. Increased fire protection of primary structural framing members usually permits lower insurance premiums.

In these assemblies, a hard and abrasion-resistant surface may be obtained with a thin veneer (1/8" to 3/32" thick) of specially formulated, high-strength veneer finish. IMPERIAL Plaster is applied over IMPERIAL FIRECODE C Gypsum Base in lieu of gypsum panels.



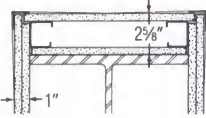
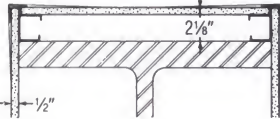
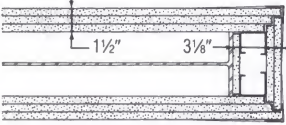
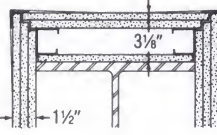
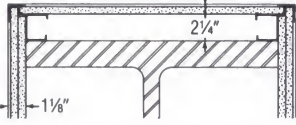
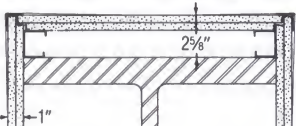
UL designs



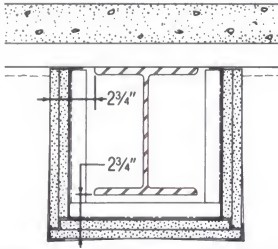
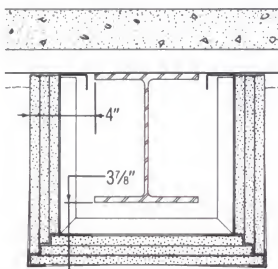
UL designs

*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Column Fireproofing/Test Data

Fire rating	Column type	Fire-rated construction Detail & physical data	Description	Comments	System reference
2 hr.	W10 x49		Gypsum Drywall Fireprfg— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—double layer over ea flange end—double layer on flange faces separ by 158ST25 steel studs & screw att—met beads on corners—joints fin— UL Des X518		A
2 hr.	W14 x228		Gypsum Drywall Fireprfg— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—panels screw att to 158ST25 steel studs at col corners—met corner beads—joints fin— UL Des X521		B
2 hr.	varies		Gypsum Drywall Fireprfg—3 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—triple layer over ea flange end—inner layers on flange face separ by 158ST25 steel studs & screw att—met beads on corners—joints fin— UL Des X524	Rating applies to tapered or constant-section prefabricated metal building columns	C
3 hr.	W10 x49		Gypsum Drywall Fireprfg—3 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—triple layer over ea flange end—inner layers on flange face separ by 158ST25 steel studs & screw att—met beads on corners—joints fin— UL Des X515		D
3 hr.	W14 x228		Gypsum Drywall Fireprfg— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—double layer over ea web face—panels screw att to 158ST25 steel studs at col corners—met corner beads—joints fin— UL Des X514		E
4 hr.	W14 x228		Gypsum Drywall Fireprfg—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, around col—panels screw att to 158ST25 steel studs at col corners—met corner beads—joints fin— UL Des X507		F

Beams/Test Data

Fire rating	Beam type	Fire-rated construction Detail & physical data	Description & test no.	Comments	System reference
2 hr. (beam only)	W8 x24		Gypsum Drywall Caged Beam Fireprfg— $1\frac{1}{2}$ " steel run chan brackets 24" o.c.— $1\frac{3}{8}$ " x $\frac{7}{8}$ " corner angles att to chan brackets—dbl layer $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, att with Type S screws—met beads on corners—joints fin— $2\frac{1}{2}$ " conc deck on fluted steel flr— UL Des N501—UL Des N502	Design N502 based on $1\frac{1}{2}$ " steel runner for corner angles and coped brackets	A
3 hr. (beam only)	W8 x24		Gypsum Drywall Caged Beam Fireprfg— $1\frac{1}{2}$ " steel run chan brackets 24" o.c.— $1\frac{3}{8}$ " x $\frac{7}{8}$ " corner angles att to brackets—3 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints fin— $2\frac{1}{2}$ " conc deck on fluted steel flr— UL Des N505	Extends drywall use to beam protection. Fire rating for restrained assembly; 2-hour rating for unrestrained assembly	B

Lightweight Framing Systems for Exterior Non-Load Bearing Curtain Walls

Description

Exterior curtain wall systems with steel framing have been in use for over 20 years and adapt easily to basic design concepts using conventional materials, methods and equipment. These systems have been specified in all parts of the world for office buildings, schools, shopping centers, motels, hotels and apartments.

Versatile Designs—Exterior stucco surfaces offer textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by addition of coarse colored aggregates which contrast boldly with brick, glass and concrete.

Surface Finishes—Interior and exterior facings in various combinations meet specific functional and esthetic needs.

Fire Resistant—2-hour rating (see table), other ratings available.

Sound Isolation—The dampening effect of air space and insulation within the framing cuts noise transmitted to the interior.

Thermal Performance—Systems will accommodate energy design requirements for heated and air-conditioned buildings. Greater insulation values are attainable in less wall thickness with steel framing than can be attained with block or concrete.

Lightweight—Systems cut weight of brick masonry walls by 25%, of textured panel assemblies up to 66%, to reduce structural foundation requirements.

Air and Water Infiltration—Watertight construction is assured when gypsum sheathing is covered with No. 15 asphalt felt or TYVEK Housewrap sheets; airtight construction when sealants are used in appropriate locations (see Good Design Practices).

Framing Systems

UNIMAST Steel Studs are channel-shaped and roll-formed from steel with corrosion-resistant coating and provide wall framing members suitable for attachment of interior drywall, veneer plaster bases and conventional plaster systems. They are an ideal back-up for brick veneer assemblies, reducing dead load 25% in comparison to concrete block backings. The wide choice of stud sizes and spacings accommodates insulation requirements, allows wall heights to 30', wind loads to 40 psf, and a variety of building modules. Requirements for greater wall heights and wind loads can usually be met. Consult architect and/or structural engineer for details.

Studs are anchored by screws or welds at top and bottom to specially designed runners, and THERMAFIBER Insulation is inserted in the cavity. Special CR deep leg runner, when left unattached to studs, accommodates floor slab deflection without imposing an axial load on the studs. Studs are braced laterally by screw-attached gypsum sheathing on the exterior and gypsum panels or base on the interior side. Alternately, studs may be braced with straps or cold-rolled channels designed according to AISI Specifications.

Exterior Surfaces

Exterior surfaces may be unit masonry, portland cement-lime stucco or various decorative panels or siding materials. Brick or other masonry units are laid with a portland cement mortar and BONDCRETE Mason's Lime and secured every 2½ sq. ft. with brick anchors screw-attached through the sheathing to steel studs. This system offers speedier building enclosure with the protection of a double-cavity wall and greater variety of insulation options.

Portland cement-BONDCRETE Lime stucco is applied in three coats to a 1" thickness over 3.4-lb. galvanized metal lath. Self-furring metal lath is screw-attached to steel studs through SHEETROCK brand Gypsum Sheathing.

Lightweight, prefabricated glass-fiber reinforced concrete panels with 5" thick THERMAFIBER CW-40 Insulation in the stud cavity offer 2-hr. fire resistance in addition to high thermal performance.

Ceramic tile, thin brick, aggregated or porcelain-enameled panels, prefinished siding and metal panels, aluminum-framed glass and exterior insulation systems may be used over this framing. These surfaces and other dry exterior facings weighing up to 8 psf are applied over sheathing and screw-attached to studs.

Interior Surfaces

Interior surfaces may be gypsum drywall or high-strength veneer finish. Hundreds of variations in finishes ranging from smooth trowel to oriental-style textures, painted or fabric covered, are available for interior design.



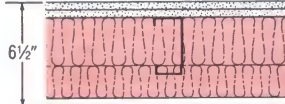
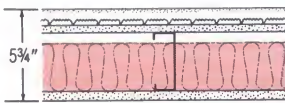
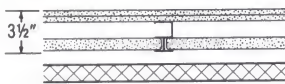
With *gypsum drywall*, where a vapor retarder is required on the interior side, SHEETROCK brand Gypsum Panels, Foil-Back, ½" or ⅝" thick, are screw-attached to the steel studs. SHEETROCK brand Gypsum Panels, FIRECODE Core, provide additional resistance to fire exposure, and are used in assemblies where a fire rating is required.

Veneer plaster finish interiors that require a vapor retarder on the interior side have Foil-Back IMPERIAL Gypsum Base screw-attached to steel studs. IMPERIAL Finish or DIAMOND Interior Finish is applied ⅝" to ¾" thick over this 4' wide base.

Limitations

- 1 Non-load bearing constructions.
- 2 All details, specifications, and data computations contained in this publication concerning Exterior Framing Systems are intended as a general guide for use in wall construction. NO PRODUCT SHOULD BE SPECIFIED OR USED IN ANY DESIGN OR CONSTRUCTION OF ANY STRUCTURE WITHOUT COMPLETE AND DETAILED EVALUATION BY A QUALIFIED STRUCTURAL ENGINEER AND/OR ARCHITECT TO VERIFY THE SUITABILITY OF THE PRODUCT DESCRIBED HEREIN FOR USE IN A GIVEN STRUCTURE.
- 3 United States Gypsum Company assumes no liability for failure resulting from use of alternative materials or improper application or installation of any exterior framing system as selected by the design professional.


Non-Load Bearing Exterior Curtain Wall/Test Data

Fire rating*	Fire-rated construction Detail & physical data	Description & test no.	System reference
1 hr.		35SJ20 steel studs 24" o.c.—1/2" SHEETROCK brand gypsum sheathing—1" extruded polystyrene insulation installed horizontally—1/2" cedar plywood exterior—3/4" THERMAFIBER fire safety FS-15 blankets between studs—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—joints fin— CEG 11-9-79	A
1 1/2 hr.		Glass-fiber reinforced concrete panels, 6'8 1/2" x 7'0", 1/2" thick, bolted to frame—40SJ16 steel studs 16" o.c. anchored to panel—5" THERMAFIBER CW-40 curtain wall insulation in cavity—1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior screw-attached to studs—joints finished— CEG 2-3-82	B
2 hr.		Glass-fiber reinforced concrete panels, 6'8 1/2" x 7'0", 1/2" thick, bolted to frame—40SJ16 steel studs 16" o.c. anchored to panel—5" THERMAFIBER CW-40 curtain wall insulation in cavity—double-layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, interior—joints finished— CEG 4-23-82	C
2 hr.		358ST20 steel studs 16" o.c.—1/2" SHEETROCK brand gypsum sheathing—self-furring metal lath—1" cement-lime stucco exterior 3" THERMAFIBER fire safety FS-15 blankets between studs—1/2" SHEETROCK brand gypsum panels, foil-back, FIRECODE C core, or IMPERIAL FIRECODE C gypsum base and 1/4" IMPERIAL finish interior— T-4851-OSU	D
2 hr.		C-H stud system—1" SHEETROCK brand liner panels set between USG steel C-H studs on exterior—2 layers SHEETROCK brand gypsum panels, FIRECODE C core, screw attached on interior—joints finished— U of C 4-2-75**	E

*Fire ratings apply when assemblies are constructed with framing members having heavier gauge and/or larger dimensions.

**Fire rating also applies with IMPERIAL FIRECODE C Base and veneer finish surface.

Note: For test data on load-bearing exterior walls, refer to page 5.

 **THERMAFIBER Insulation.**

UNIMAST Stud Selector Guide

To help select the best stud product to use with various exterior finishes in exterior walls, limiting height tables are shown on pages 22 and 23. These tables provide simple span limiting height guidelines for various styles of steel studs, for wind loads from 15 psf to 40 psf, three stud spacings, maximum allowable deflection and basic wall design properties. This folder considers design when the exterior brick veneer is supported by ledger angles at each floor and the curtain wall framing and interior finish are supported at each floor (see details, page 24). When brick veneer is continuous and supported at the foundation and periodically at the structure, follow current Brick Institute of America Technical Notes for design information. Values in tables are computed in accordance with AISI Specification for the Design of Cold-Formed Steel Structural Members, 1986 edition.

The guide on the right helps you choose a correct table to use in finding the simple span limiting height criteria which may be appropriate for each stud. Deflection criteria established by various authorities serve as the basis for determining stud heights suitable for different exterior finishes. Choose the stud style desired, then go to stud table for spacing, limiting heights and stud sizes.

Data is the latest technical information available at the time this Folder went to press. For assistance or consultation in selecting the appropriate stud member and preparing project framing specifications, contact your local United States Gypsum Company office or Unimast Incorporated Technical Department.

Guide to limiting height tables

table 10

Exterior finish and framing	Deflection criteria			Table reference ⁽¹⁾	
	Authority	Recommended max. defl.	Design basis	SJ-stud	ST20 stud
exterior stucco					
simple span stud wall	industry practice	L/360	studs only	11	12
brick veneer					
simple span masonry & stud wall (low-rise ⁽²⁾ and high-rise)	Clemson tests	L/360	studs only	11	12
continuous span masonry (high-rise)					
—simple span stud wall	BIA Tech. Note 28B	L/600	studs only	11	12
—continuous span stud wall	BIA Tech. Note 28B	L/600	studs only	(3)	(3)
continuous span masonry (low-rise)					
—simple span stud wall	industry practice	L/360	studs only	11	12
—continuous span stud wall	industry practice	L/360	studs only	(3)	(3)
spandrel panels	BIA Tech. Note 28B	L/600 for cont. span portion ⁽⁴⁾	studs only	(3)	(3)
prefinished panels	manufr. recommend.	L/240	studs only	11	12
simple span		L/360	studs only	11	12

(1) Tables referred to are on pages 22 and 23. (2) Low-rise means three stories or less. (3) No tables available; design for specific conditions. See stud properties page 7 and refer to Unimast Incorporated for technical assistance. (4) Use L/360 deflection criteria for cantilever portion of span.

Curtain Wall, Non-Load Bearing, Limiting Heights Exterior Stud Framing—SJ style (F_y = 40 ksi)

table 11
stud properties only

Limiting heights calculated using stud properties⁽¹⁾

Design criteria		Wind load	Deflection limitation	Stud spacing (in o.c.)	Simple span limiting heights ⁽¹⁾ for steel studs by size and gauge																			
					3½" stud-362SJ				4" stud-40SJ				6" stud-60SJ				7½" stud-725SJ				8" stud-80SJ			
					20	18	16	14	20	18	16	14	20	18	16	14	18	16	14	18	16	14		
15 psf	L/240	13/4"	14/7"	15/8"	16/10"	14/4"	15/8"	16/11"	18/2"	19/10"	21/9"	23/7"	25/3"	27/6"	29/10"	32/0"								
		12/1"	13/3"	14/4"	15/4"	13/0"	14/3"	15/5"	16/6"	18/0"	19/9"	21/5"	22/11"	23/0"	25/0"	26/9"	27/1"	29/1"						
		10/7"	11/7"	12/6"	13/4"	11/4"	12/5"	13/5"	14/5"	15/9"	17/3"	18/8"	20/0"	20/2"	21/10"	23/5"	24/0"	25/4"						
		10/7"	11/7"	12/6"	13/4"	11/4"	12/5"	13/5"	14/5"	15/9"	17/3"	18/8"	20/0"	20/2"	21/10"	23/5"	24/0"	25/4"						
20 psf	L/360	9/3"	10/1"	10/11"	11/8"	9/11"	1-10"	11/9"	12/7"	13/9"	15/1"	16/4"	17/6"	19/1"	2-5"	19/1"	20/8"	22/2"						
		9/1"	10/3"	11/7"	12/5"	10/7"	11/7"	12/6"	13/4"	14/7"	16/0"	17/4"	18/7"	18/8"	20/3"	21/9"	20/3"	22/0"	23/7"					
		8/11"	9/8"	10/6"	11/3"	9/7"	10/6"	11/4"	12/2"	13/3"	14/7"	15/9"	16/11"	17/0"	18/5"	19/9"	18/5"	19/11"	21/5"					
		7/9"	8/6"	9/2"	9/10"	8/5"	9/2"	9/11"	10/7"	11/7"	12/9"	13/9"	14/10"	16/1"	17/3"	16/1"	17/5"	18/8"						
20 psf	L/240	12/1"	13/3"	14/4"	15/4"	13/0"	14/3"	15/5"	16/6"	18/0"	19/9"	21/5"	22/11"	23/0"	25/0"	26/9"	25/0"	27/1"	29/0"					
		11/0"	12/0"	13/0"	13/11"	11/10"	12/11"	14/0"	15/0"	16/5"	17/11"	19/5"	20/10"	20/11"	22/8"	24/4"	22/8"	24/7"	26/5"					
		9/7"	10/6"	11/4"	12/2"	10/4"	11/4"	12/3"	13/1"	14/4"	15/8"	17/0"	18/2"	18/3"	19/10"	21/3"	19/10"	21/6"	23/1"					
		8/5"	9/2"	9/11"	10/7"	9/0"	9/11"	10/8"	11/5"	12/6"	13/8"	14/10"	15/11"	16/0"	17/4"	18/7"	17/4"	18/9"	20/2"					
25 psf	L/360	8/11"	9/9"	10/6"	11/3"	9/7"	10/6"	11/4"	12/2"	13/3"	14/7"	15/9"	16/11"	17/0"	18/5"	19/11"	18/5"	19/11"	21/5"					
		8/1"	9/8"	10/6"	11/3"	9/7"	10/6"	11/4"	12/2"	13/3"	14/7"	15/9"	16/11"	17/0"	18/5"	19/9"	18/5"	19/11"	21/5"					
		7/1"	7/9"	8/4"	8/11"	7/7"	8/4"	9/0"	9/8"	10/7"	11/7"	12/6"	13/5"	13/6"	14/7"	15/8"	14/7"	15/10"	17/0"					
		11/3"	12/3"	13/3"	14/2"	12/1"	13/3"	14/4"	15/4"	16/9"	18/4"	19/10"	21/3"	21/5"	23/2"	24/10"	23/2"	25/2"	26/11"					
30 psf	L/240	10/2"	11/2"	12/1"	12/11"	11/0"	12/0"	13/0"	12/11"	15/2"	16/8"	18/0"	19/4"	19/5"	21/1"	22/7"	21/1"	22/10"	24/6"					
		9/10"	10/9"	11/7"	12/5"	10/7"	11/7"	12/6"	13/4"	14/7"	16/0"	17/4"	18/7"	18/8"	20/3"	21/9"	20/3"	22/0"	23/7"					
		8/11"	9/9"	10/6"	11/3"	9/7"	10/6"	11/4"	12/2"	13/3"	14/7"	15/9"	16/11"	17/0"	18/5"	19/9"	18/5"	19/11"	21/5"					
		7/9"	8/6"	9/2"	9/10"	8/5"	9/2"	9/11"	10/7"	11/7"	12/9"	13/9"	14/9"	14/10"	16/1"	17/3"	16/1"	17/5"	18/8"					
30 psf	L/600	8/3"	9/1"	9/9"	10/6"	8/11"	9/9"	10/6"	11/3"	12/4"	13/6"	14/8"	15/8"	15/9"	17/1"	18/4"	17/1"	18/6"	19/10"					
		7/6"	8/3"	8/11"	9/6"	8/1"	8/10"	9/7"	10/3"	14/4"	15/6"	16/8"	16/8"	14/4"	15/6"	16/8"	15/6"	16/10"	18/1"					
		6/7"	7/2"	7/9"	8/4"	7/1"	7/9"	8/4"	8/11"	9/9"	10/9"	11/7"	12/5"	12/6"	13/7"	14/6"	13/7"	14/8"	15/9"					
		10/7"	11/7"	12/8"	13/4"	11/4"	12/5"	13/5"	14/5"	15/9"	17/4"	18/8"	20/0"	20/2"	21/10"	23/5"	21/10"	23/8"	25/4"					
35 psf	L/240	9/7"	10/6"	11/4"	12/2"	10/4"	11/4"	12/3"	13/1"	14/5"	15/8"	17/0"	18/2"	18/3"	19/10"	21/3"	19/10"	21/6"	23/1"					
		8/5"	9/2"	9/11"	10/7"	9/0"	9/11"	10/8"	11/5"	12/6"	13/8"	14/10"	15/11"	16/0"	17/4"	18/7"	17/4"	18/9"	20/2"					
		8/3"	10/1"	10/11"	11/8"	9/11"	10/10"	11/9"	12/7"	13/9"	15/1"	16/4"	17/6"	17/7"	19/1"	20/5"	19/1"	20/8"	22/2"					
		8/5"	9/2"	9/11"	10/7"	9/0"	9/11"	10/8"	11/5"	12/6"	13/8"	14/10"	15/11"	16/0"	17/4"	18/7"	17/4"	18/9"	20/2"					
35 psf	L/600	7/4"	8/0"	8/8"	9/3"	7/11"	8/8"	9/4"	10/0"	10/11"	12/0"	13/0"	13/11"	13/11"	15/2"	16/3"	15/2"	16/5"	17/7"					
		7/9"	8/6"	9/2"	9/10"	8/5"	9/2"	9/11"	10/7"	11/7"	12/9"	13/9"	14/9"	14/10"	16/1"	17/3"	16/1"	17/5"	18/8"					
		7/1"	7/9"	8/4"	8/11"	7/7"	8/4"	9/0"	9/8"	10/7"	11/7"	12/6"	13/5"	13/6"	14/7"	15/8"	14/7"	15/10"	17/0"					
		6/2"	6/9"	7/4"	7/10"	6/9"	7/3"	7/10"	8/5"	9/3"	10/1"	10/11"	12/0"	13/0"	11/9"	12/9"	13/8"	12/9"	13/10"	14/10"				
35 psf	L/240	10/1"	11/0"	11/10"	12/8"	10/10"	11/10"	12/9"	13/8"	15/0"	16/5"	17/9"	19/0"	19/1"	20/9"	22/6"	22/6"	22/6"	24/1"					
		9/1"	10/0"	10/9"	11/6"	9/10"	10/9"	11/7"	12/5"	14/11"	16/2"	17/3"	17/4"	18/10"	20/2"	18/10"	20/5"	21/11"	21/11"					
		8/0"	8/9"	9/5"	10/1"	8/7"	9/5"	10/2"	10/10"	11/10"	13/0"	14/1"	15/1"	15/2"	16/5"	17/8"	16/5"	17/10"	19/2"					
		8/9"	9/7"	10/4"	11/1"	9/5"	10/4"	11/2"	11/11"	13/1"	14/4"	15/6"	16/7"	16/8"	18/1"	19/5"	18/1"	19/8"	21/1"					
40 psf	L/360	8/0"	8/9"	9/5"	10/1"	7/6"	8/2"	8/10"	9/6"	10/4"	11/4"	12/4"	13/2"	13/3"	14/4"	15/5"	14/4"	15/7"	16/9"					
		7/0"	7/7"	8/3"	8/10"	7/6"	8/2"	8/10"	9/6"	10/4"	11/4"	12/4"	13/2"	13/3"	14/4"	15/5"	14/4"	15/7"	16/9"					
		7/5"	8/1"	8/9"	9/4"	8/0"	8/9"	9/5"	10/1"	11/0"	12/1"	13/1"	14/0"	14/1"	15/3"	16/4"	15/3"	16/7"	17/9"					
		6/9"	7/4"	8/0"	8/6"	7/3"	7/11"	8/7"	9/2"	11/11"	10/0"	11/0"	12/0"	12/10"	13/10"	14/11"	13/11"	16/2"	17/9"					
40 psf	L/600	5/10"	6/5"	6/11"	7/5"	6/4"	6/11"	7/6"	8/0"	8/9"	9/7"	10/5"	11/2"	11/2"	12/1"	13/0"	12/1"	13/2"	14/1"					
		9/7"	10/6"	11/4"	12/2"	10/4"	11/4"	12/3"	13/1"	14/4"	15/8"	17/0"	18/2"	18/3"	19/10"	21/3"	19/10"	21/6"	23/1"					
		8/9"	9/7"	10/4"	11/0"	9/5"	10/3"	11/1"	11/11"	13/0"	14/3"	15/5"	16/6"	16/7"	18/0"	19/4"	18/0"	19/6"	20/11"					
		7/7"	8/4"	9/0"	9/8"	8/2"	9/0"	9/8"	10/5"	11/4"	12/5"	13/6"	14/5"	14/6"	15/9"	17/1"	15/9"	17/1"	18/4"					
40 psf	L/240	8/5"	9/2"	9/11"	10/7"	8/2"	9/0"	9/8"	10/5"	11/4"	12/5"	13/6"	14/5"	16/0"	17/4"	18/7"	17/4"	18/9"	20/2"					
		7/7"	8/4"	9/0"	9/8"	8/2"	9/0"	9/8"	10/5"	11/4"	12/5"	13/6"	14/5"	16/0"	17/4"	18/7"	17/4"	18/9"	20/2"					
		6/8"	7/3"	7/10"	8/5"	7/2"	7/10"	8/6"	9/1"	9/11"	10/10"	11/9"	12/7"	12/8"	13/9"	14/9"	13/9"	14/11"	16/0"					
		7/1"	7/9"	8/4"	8/11"	7/7"	8/4"	9/0"	9/8"	10/7"	11/7"	12/6"	13/5"	13/6"	14/7"	15/8"	14/7"	15/10"	17/0"					
40 psf	L/600	6/5"	7/0"	7/7"	8/2"	6/11"	7/7"	8/2"	8/9"	10/6"	11/4"	12/2"	13/3"	14/3"	15/5"	16/5"	14/3"	15/5"	16/5"					
		7/9"	8/4"	9/0"	9/8"	7/7"	8/4"	9/0"	9/8"	10/6"	11/4"	12/2"	13/3"	14/3"	15/5"	16/5"	14/3"	15/5"	16/5"					
		5/7"	6/2"	6/8"	7/1"	6/11"	7/7"	8/2"	8/9"	10/6"	11/4"	12/2"	13/3"	14/3"	15/5"	16/5"	14/3"	15/5"	16/5"					
		6/2"	6/8"	7/1"	7/7"	6/11"	7/7"	8/2"	8/9"	10/6"	11/4"	12/2"	13/3"	14/3"	15/5"	16/5"	14/3"	15/5"	16/5"					

Conforms to 1986 AISI Specification for the Design of Cold-Formed Steel Structural Members. See structural properties, page 7.
(1) Any independently supported exterior treatment over gypsum sheathing. Based on properties of studs with stress increased 33% for wind loading. Yield strength for runners is 33 ksi.

Curtain Wall, Non-Load Bearing, Limiting Heights Exterior Stud Framing—ST20 style (20-ga.) ($F_y = 33$ ksi)

table 12

Maximum allowable simple span limiting heights calculated using stud properties⁽¹⁾

stud properties only

Design criteria		Deflection limitation (L/240)				Deflection limitation (L/360)				Deflection limitation (L/600)			
Wind load (psf)	Stud spacing (in o.c.)	2½"	3"	4"	6"	2½"	3"	4"	6"	2½"	3"	4"	6"
		212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20	212ST20	358ST20	400ST20	600ST20
15 (80 mph)	12	9'1"	12'2"	13'2"	18'2"	8'0"	10'7"	11'6"	15'10"	6'8"	9'0"	9'8"	13'4"
	16	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	24	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'1"	7'8"	10'8"
20 (90 mph)	12	8'3"	11'1"	12'0"	16'7"	7'3"	9'8"	10'6"	14'6"	6'1"	8'2"	8'9"	12'2"
	16	7'6"	10'1"	10'10"	15'0"	6'7"	8'9"	9'6"	13'1"	5'7"	7'4"	8'0"	11'1"
	24	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
25 (100 mph)	12	7'8"	10'3"	11'1"	15'4"	6'8"	9'0"	9'8"	13'4"	5'8"	7'7"	8'2"	11'3"
	16	7'0"	9'3"	10'1"	14'0"	6'1"	8'2"	8'9"	12'2"	5'2"	6'10"	7'4"	10'3"
	24	6'1"	8'2"	8'9"	12'2"	5'3"	7'1"	7'8"	10'8"	4'6"	6'0"	6'6"	9'0"
30 (110 mph)	12	7'3"	9'8"	10'6"	14'6"	6'3"	8'6"	9'1"	12'7"	5'3"	7'2"	7'8"	10'8"
	16	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	24	5'9"	7'8"	8'3"	11'6"	5'0"	6'8"	7'2"	10'0"	4'2"	5'8"	6'1"	8'6"
35 (120 mph)	12	6'10"	9'2"	9'10"	13'8"	6'0"	8'0"	8'8"	12'0"	5'1"	6'9"	7'3"	10'1"
	16	6'3"	8'3"	9'0"	12'6"	5'6"	7'3"	7'10"	10'10"	4'7"	6'2"	6'7"	9'2"
	24	5'6"	7'3"	7'10"	10'10"	4'9"	6'4"	6'10"	9'6"	4'0"	5'4"	5'9"	8'0"
40 (125 mph)	12	6'7"	8'9"	9'6"	13'1"	5'9"	7'8"	8'3"	11'6"	4'10"	6'6"	7'0"	9'8"
	16	6'0"	8'0"	8'7"	11'10"	5'2"	7'0"	7'6"	10'4"	4'4"	5'10"	6'4"	8'9"
	24	5'2"	7'0"	7'6"	10'4"	4'7"	6'1"	6'7"	9'1"	3'10"	5'1"	5'7"	7'8"

(1) Any independently supported exterior treatment over gypsum sheathing. Based on properties of studs alone with stress increased 33% for wind loading. Yield strength for studs and runners is 33 ksi. Also see Design Considerations, page 32, and stud properties, page 7.

Runner Attachment Spacing

Exterior stud framing limiting heights

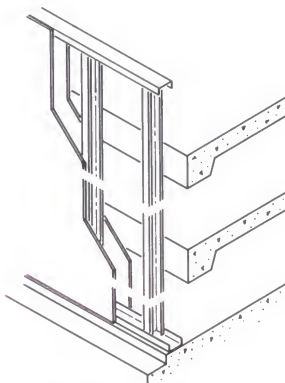
table 13

Wind load (psf)	Runner attached to 3,000-psi concrete with ½" dia. low-velocity power-driven fastener with 1½" penetration					Runner attached to 3,000-psi concrete with ½" dia. low-velocity power-driven fastener with 1½" penetration				
	CR20 runner attachment spacing (in. o.c.)					CR18 runner attachment spacing (in. o.c.)				
	24	20	16	12	8	24	20	16	12	8
15	16'1"	19'2"	23'8"	22'7"	50'4"	22'5"	26'8"	21'11"	46'8"	70'0"
20	12'3"	14'4"	18'4"	23'8"	36'8"	16'11"	20'0"	25'5"	32'11"	50'11"
25	9'7"	11'6"	14'5"	19'2"	28'9"	13'4"	16'0"	20'0"	26'8"	40'0"
30	8'1"	9'7"	12'3"	16'1"	23'8"	11'2"	13'4"	17'0"	22'5"	32'11"
35	6'11"	8'5"	10'4"	13'10"	21'3"	9'8"	11'8"	14'4"	19'4"	29'6"
40	6'0"	7'2"	9'2"	12'3"	18'4"	8'4"	10'0"	12'9"	16'11"	25'5"
Wind load (psf)	Runner attached thru ¾" plywood subfloor to 18-ga. C-closure using 1½" Type S-12 pilot-point screws					Runner attached thru ¾" plywood subfloor to 18-ga. C-closure using 1½" Type S-12 pilot-point screws				
	CR20 runner attachment spacing (in. o.c.)					CR18 runner attachment spacing (in. o.c.)				
	24	20	16	12	8	24	20	16	12	8
15	12'10"	15'6"	19'4"	25'10"	28'9"	15'8"	18'9"	23'6"	31'4"	47'0"
20	9'8"	11'7"	14'6"	19'4"	29'1"	11'9"	14'1"	17'6"	23'6"	35'3"
25	7'9"	9'3"	11'7"	15'6"	23'3"	9'4"	11'4"	14'1"	18'9"	28'2"
30	6'5"	7'9"	9'8"	12'11"	19'4"	7'10"	9'4"	11'9"	15'8"	23'6"
35	5'6"	6'7"	8'3"	11'1"	16'7"	6'8"	8'0"	10'0"	13'5"	20'1"
40	4'10"	5'9"	7'3"	9'8"	14'6"	5'10"	7'0"	8'9"	11'9"	17'7"

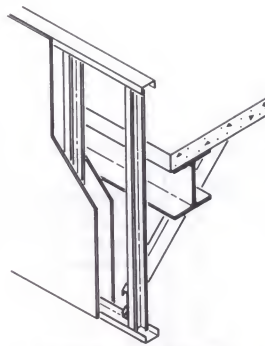
(1) Select runner attachment spacing for limiting height obtained from curtain wall tables.

(2) Based on fastener having 300 lb. safe working load in shear.

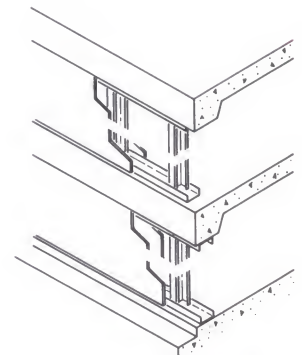
(3) Based on fastener having 400 lb. safe working load in shear.



Continuous stud wall system



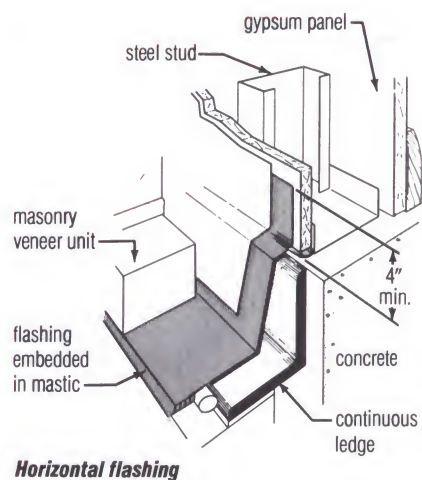
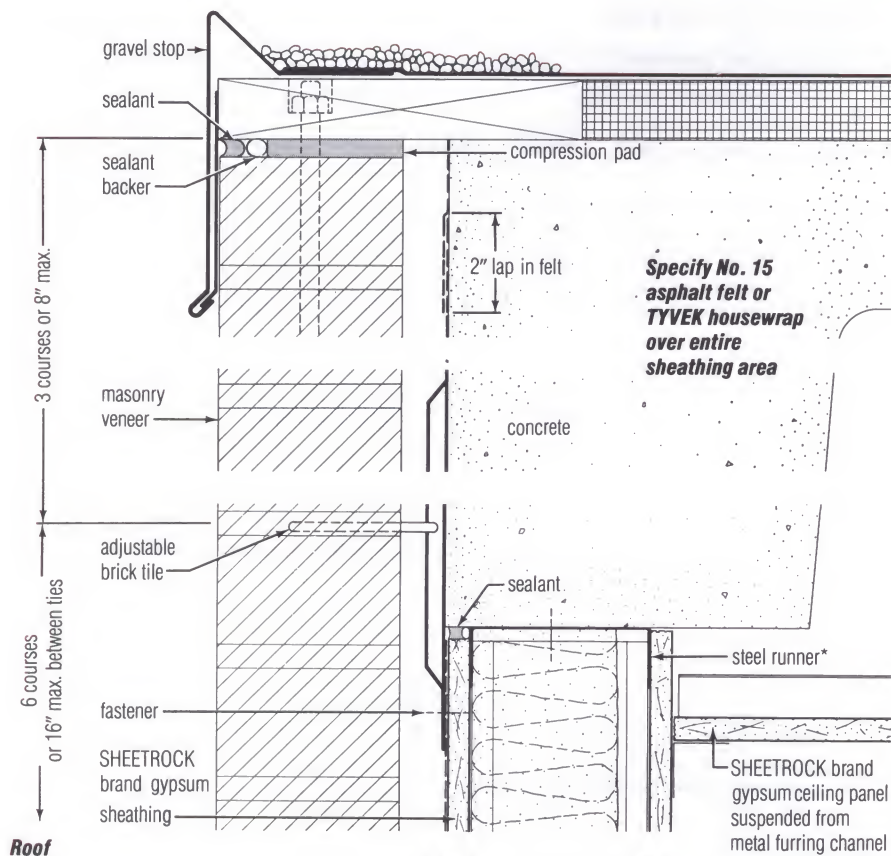
Spandrel wall system



Infill panel system

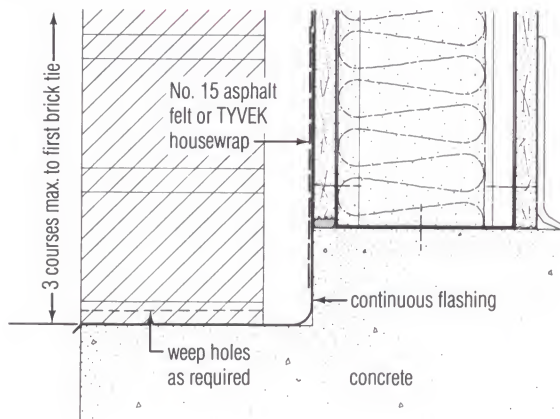
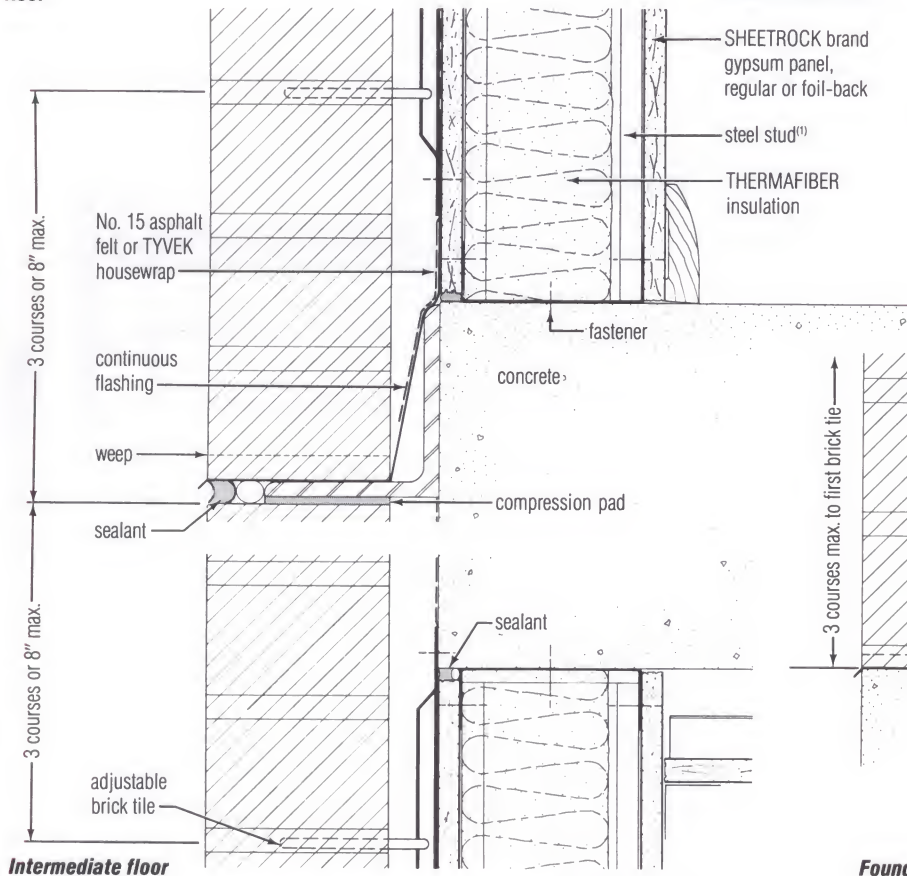
Construction Details

scale: 3" = 1'-0"



Note: Consult BIA technical note 28B, revised February 1987, for framing recommendations for brick veneer buildings exceeding three stories in height.

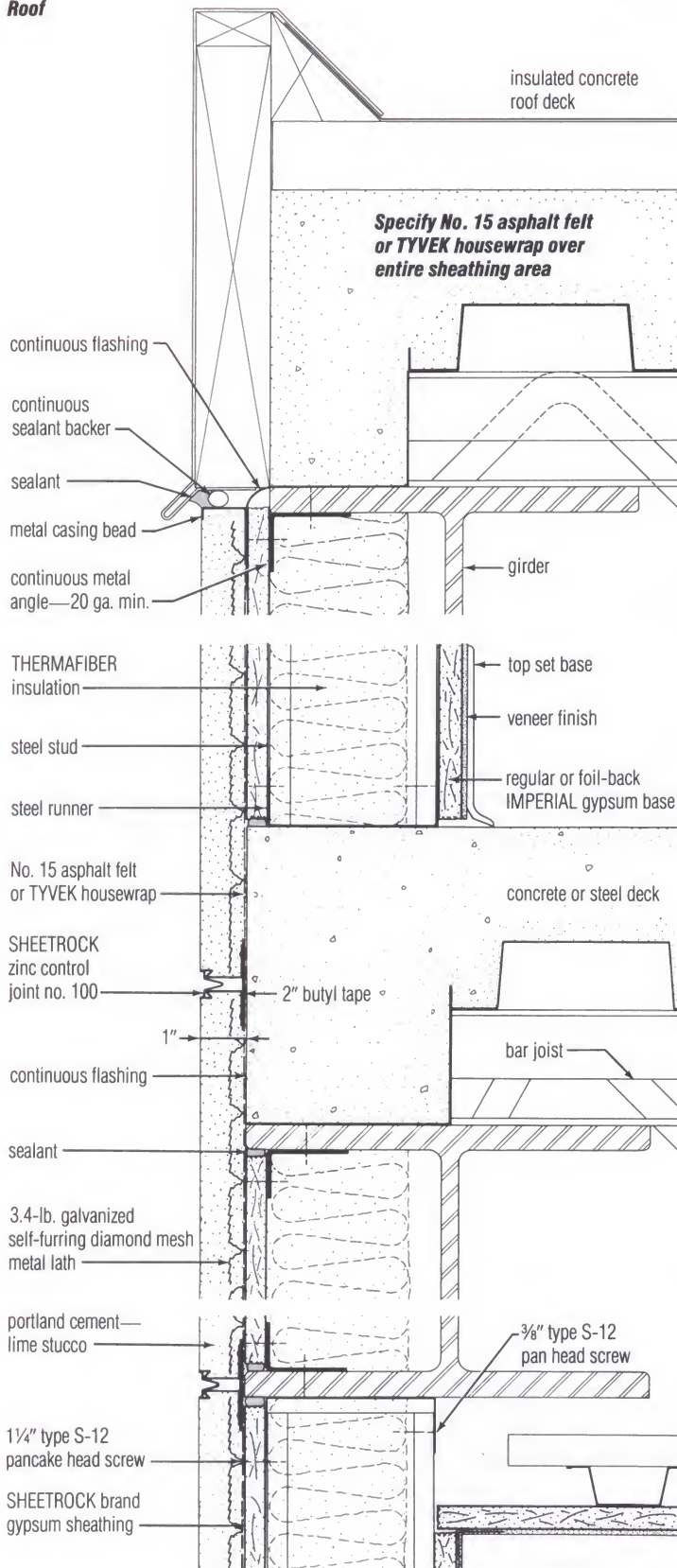
(1) **Note:** The architect and/or structural engineer shall determine appropriate selection and placement of brick ties, flashing, weep holes, wall cavity width, masonry bridging requirements, mortar selection, and workmanship requirements.



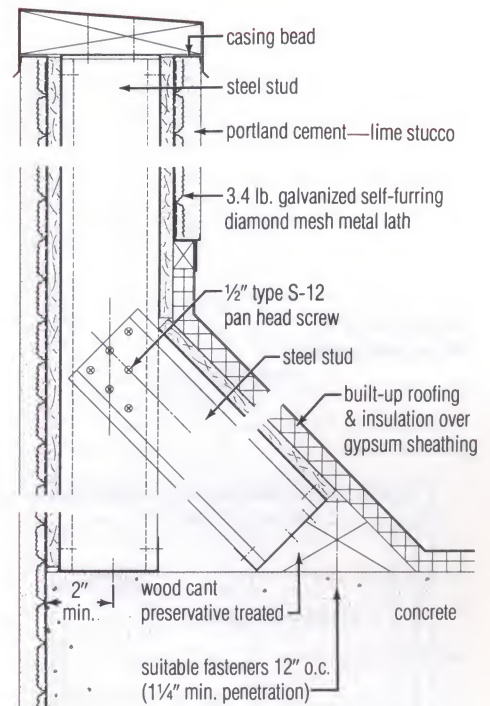
Foundation

***All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.**

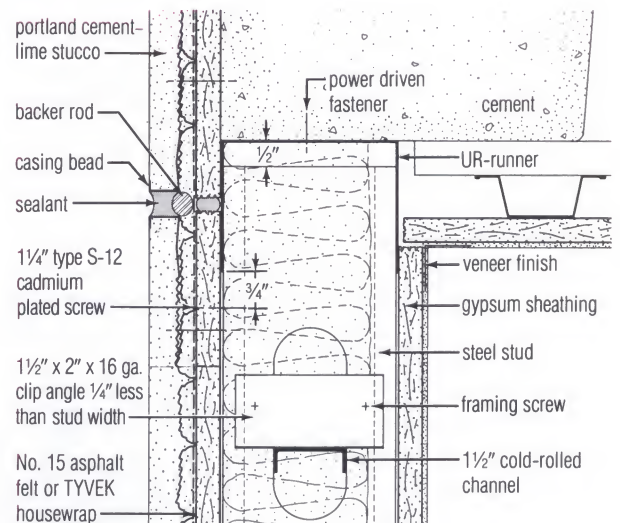
Roof



Intermediate floor

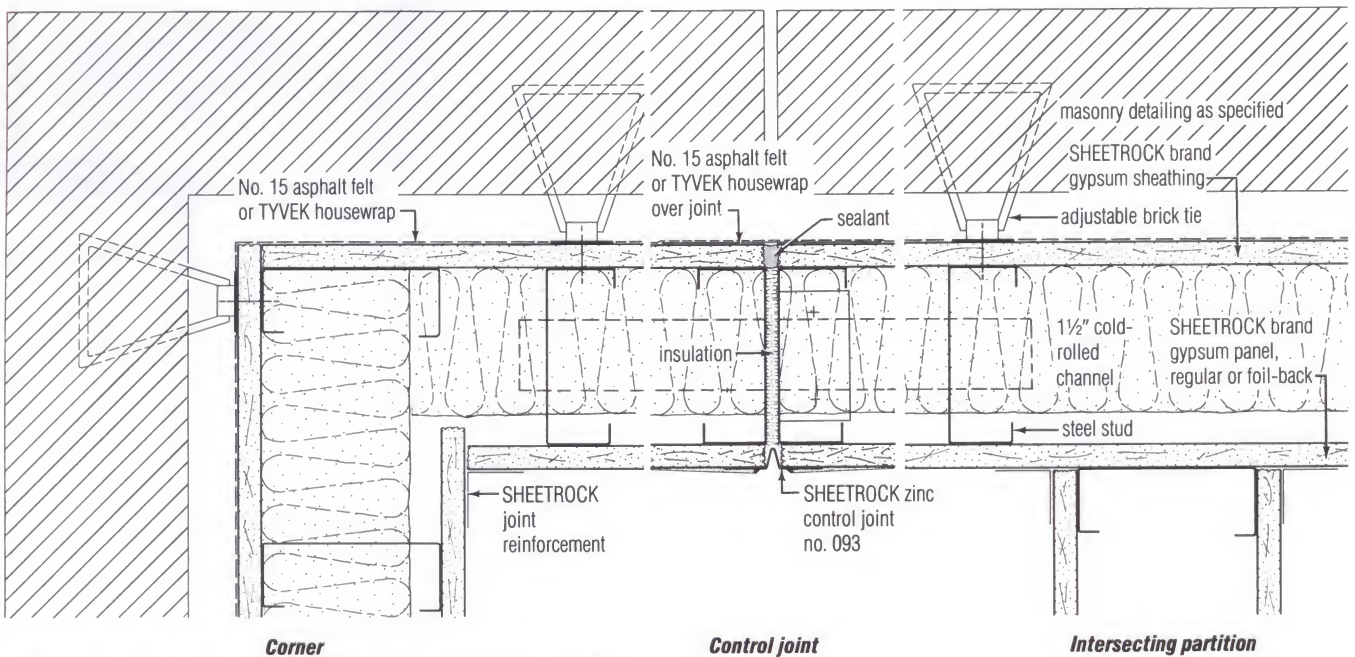
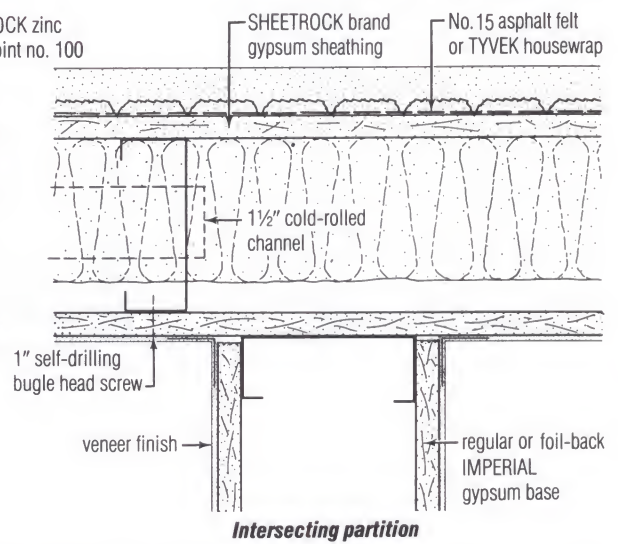
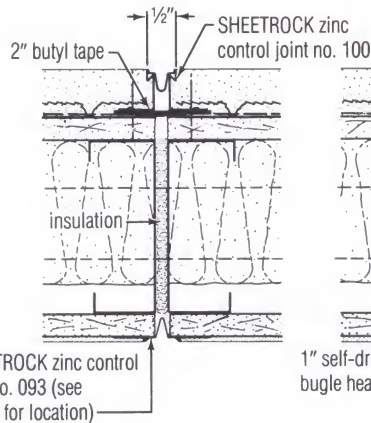
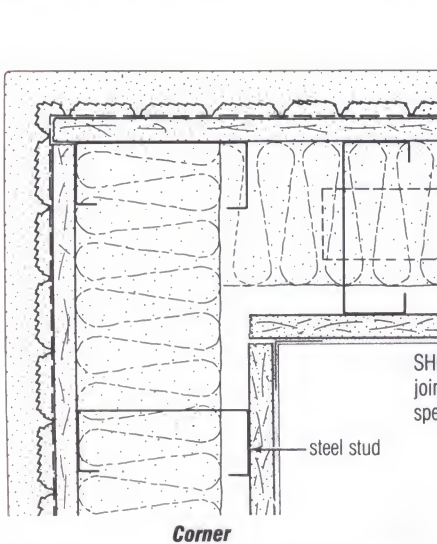
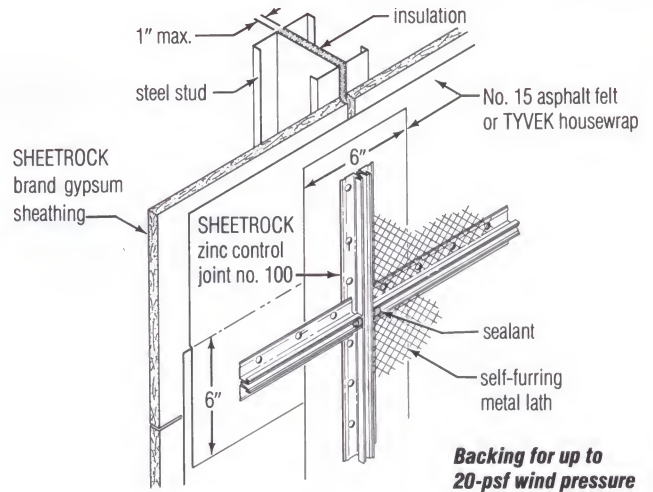
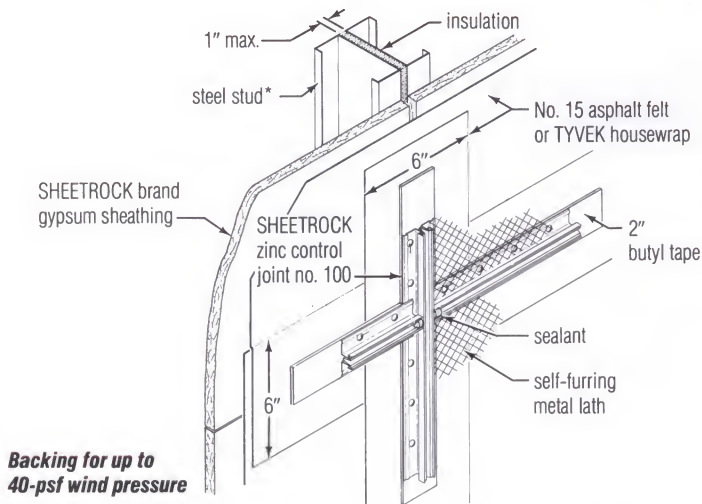


Parapet



Note: Allowable runner capacity 300 lb. per stud. Verify stud capacity with limiting height tables

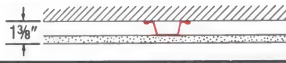



Slab deflection



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Exterior Wall Furring

 Sound-deadening material.

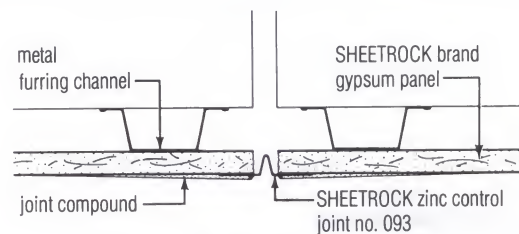
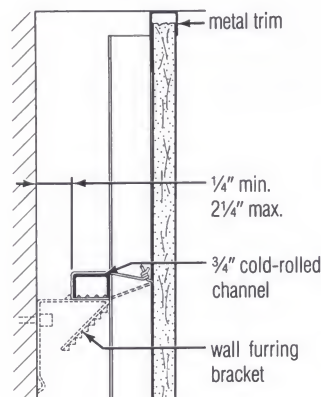
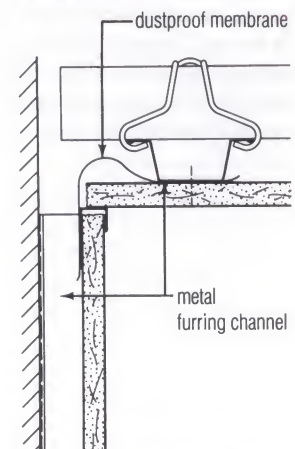
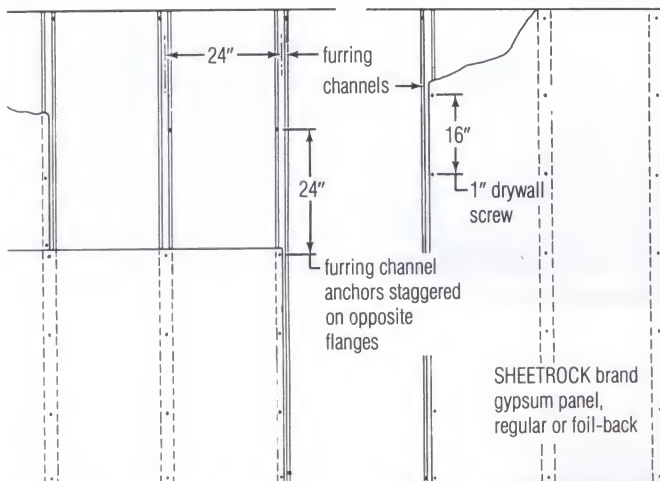
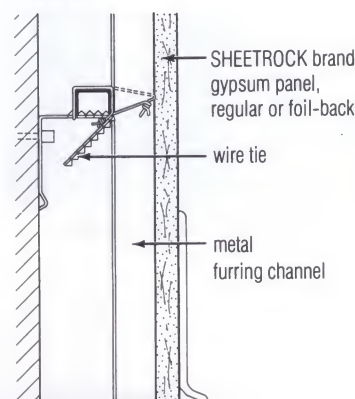
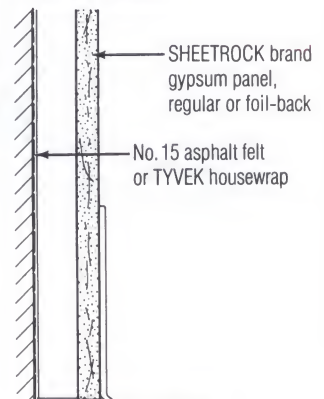
Detail & physical data	Description	Comments	System reference
	Metal furring channels 24" o.c., 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached, joints finished	Provides good vapor resistance; no limiting height	A
	SHEETROCK Z-furring channels applied vertically 24" o.c., THERMAFIBER fire safety FS-15 blankets between channels, 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached to channels, joints finished	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation; good vapor retarder; no limiting height	B
	Steel studs 24" o.c., set in runners, 1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached to studs, joints finished	Free-standing; allows for pipe chase clearance; good vapor retarder	C
	SHEETROCK Z-furring channels applied vertically 24" o.c., rigid plastic foam insulation between channels, 1/2" SHEETROCK brand gypsum panels, foil-back, applied vertically and screw-attached to channels, joints finished	Suitable for up to 3" thick insulation; no limiting height.	D

Exterior walls are readily furred using 1/2" SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to steel framing erected vertically. The foil-back panels provide an effective, low-cost vapor retarder which meets ASTM requirements for vapor permeance not exceeding 0.06 perms. In addition, foil-back panels have an emittance value of 0.05, which is used in conjunction with ASHRAE Handbook of Fundamentals for determining the thermal insulation value of a system when the foil faces a plane of air space of 1/2" to 3 1/2". Where suspended ceilings are used, a vapor retarder installed on the exterior wall should extend between structural floor slabs and above the suspended ceiling. In these systems, any of three different framing methods may be used to provide a vapor retarder, thermal insulation, and chase space for pipes, conduits and ducts.

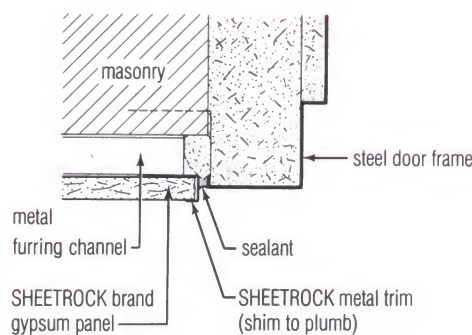
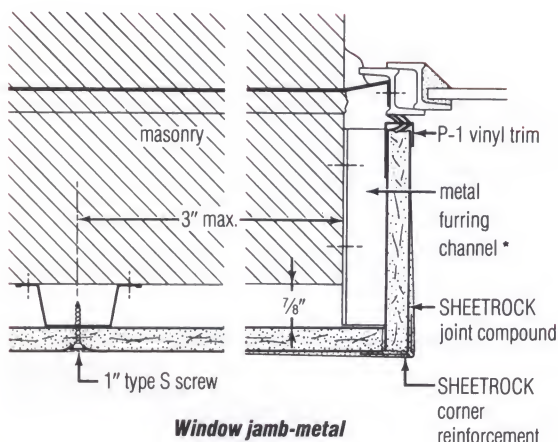
SHEETROCK brand Gypsum Panels, also provide an easily decorated facing when directly applied to interior masonry walls. See Gypsum Panels and Accessories folder SA-927 in this series for application methods and specifications.

With UNIMAST Metal Furring Channels

These furring channels, erected vertically 24" o.c., are fastened directly to interiors of exterior walls of monolithic concrete and virtually any type of masonry—brick, concrete block, tile. Channels may be furred using adjustable wall furring brackets and 3/4" cold-rolled channels to provide additional space for pipes, conduits or ducts. With SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to metal furring channels, this economical system provides an excellent vapor retarder and a durable, easily decorated interior surface. Refer to SA-921 for freestanding wall furring system.

**Control joint****Ceiling attachment****Ceiling attachment****Suspended ceiling****Perpendicular application****Parallel application****Floor attachment****Floor attachment****Direct furring**

Exterior Wall Furring

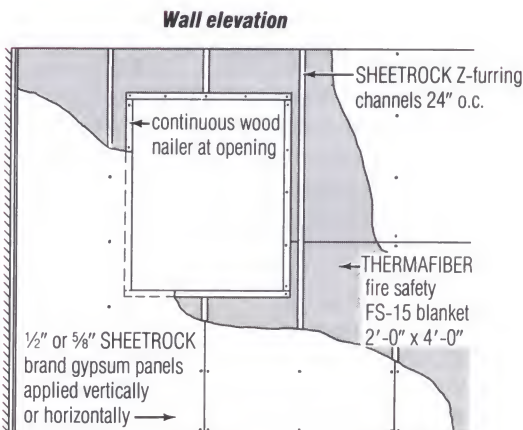


Jamb-steel door frame

With SHEETROCK Z-Furring Channels

In this assembly, SHEETROCK Z-Furring Channels spaced 24" o.c. are used to mechanically attach THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulation to interiors of exterior walls. The insulation panels are applied progressively as Z-furring channels are attached to the wall. Gypsum panels are screw-attached to channel flanges to provide a drywall surface isolated to a great degree from the masonry wall. In new construction and remodeling, this system provides a highly insulative self-furring solid backup for SHEETROCK brand Gypsum Panels.

Z-furring channels, suitable for 1" to 3" thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance. Fire-resistant THERMAFIBER Fire Safety FS-15 Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral fiber mat that meets requirements for Class A construction. For other applications, rigid plastic foam insulation offers a range of thicknesses and insulating values. Thermal resistance (R) values for various assemblies are shown on page 29.



Installing insulation



Attaching Z-furring channel



Erecting gypsum panel

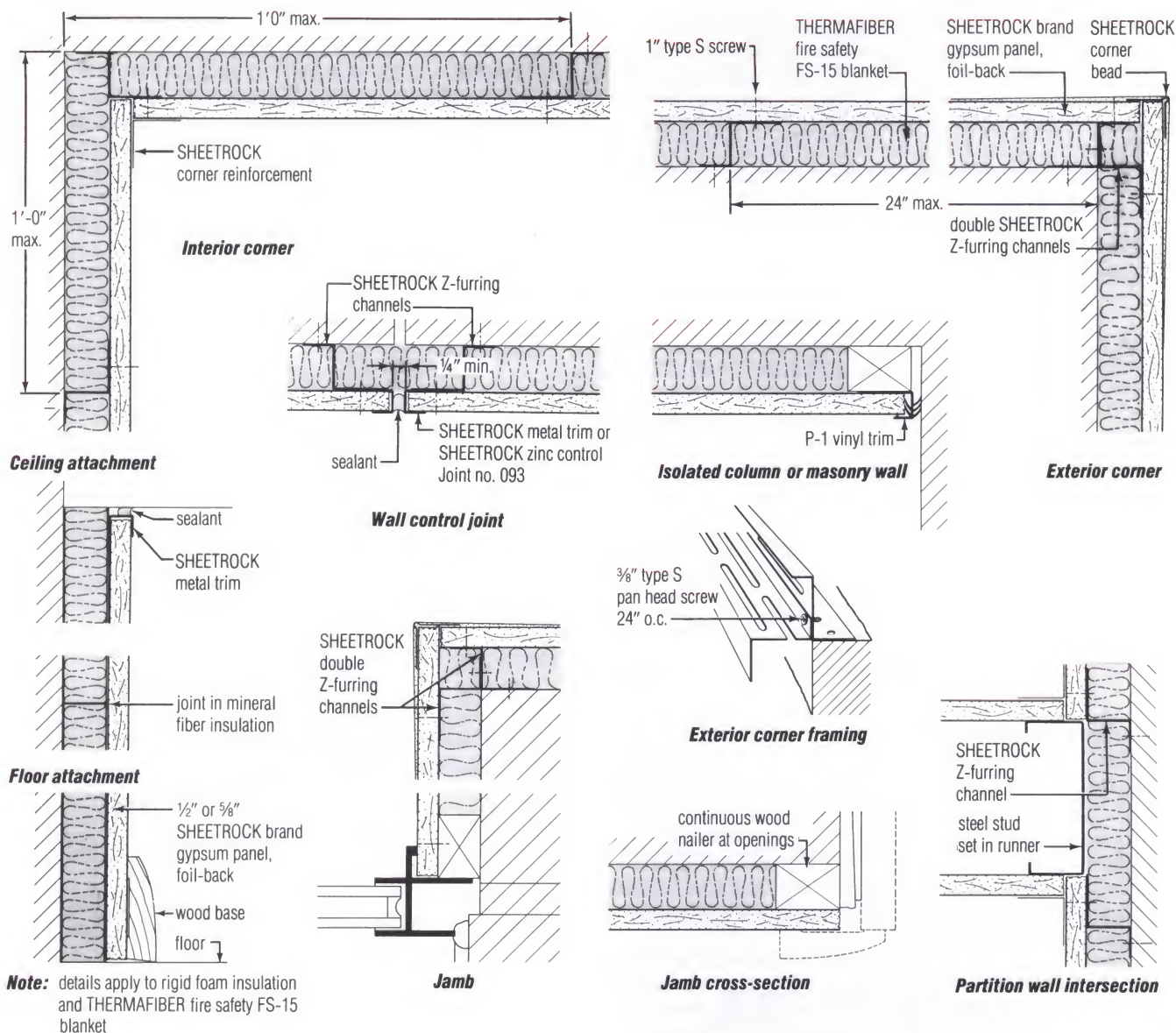


Screw-attaching panel

**All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated*

Exterior Wall Furring

scale: 3" = 1'-0"

Design thermal resistance (R) values⁽¹⁾

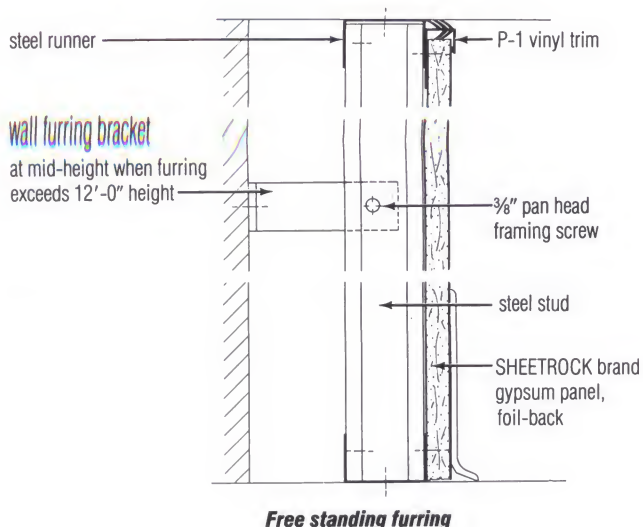
Wall construction	Nom. wall thickness	Uninsul. wall	wall ⁽²⁾ (no. insul.)	Wall insulated with— ⁽²⁾											
				THERMAFIBER Fire Safety FS-15 Blankets				Rigid polystyrene				Rigid urethane			
				1" (4.17)	1½" (6.00)	2" (8.00)	3" (12.00)	1" (5.00)	1½" (7.50)	2" (10.00)	3" (15.00)	1" (6.25)	1½" (9.38)	2" (12.50)	3" (18.75)
4" face brick & 8" cinder block	12"	3.01	4.38	7.63	9.46	11.46	15.46	8.46	10.96	13.46	18.46	9.71	12.84	15.96	22.21
4" face brick & 4" com. brick	8"	2.09	3.46	6.71	8.54	10.54	14.54	7.54	10.04	12.54	17.54	8.79	11.92	15.04	21.29
poured conc. (140 lb/cu. ft.)	8"	1.49	2.86	6.11	7.94	9.94	13.94	6.94	9.44	11.94	16.94	8.19	11.32	14.44	20.69
12" conc. block & 4" face brick	16"	2.57	3.94	7.19	9.02	11.02	15.02	8.02	10.52	13.02	18.02	9.27	12.40	15.52	21.77

(1) Resistances based on procedures and design values from 1981 ASHRAE Handbook of Fundamentals, winter conditions (15 mph wind) and neglect the effect of furring channels and fasteners. (2) Interior wall finish: 1/2" SHEETROCK brand Gypsum Panels, Foil-Back, (R-0.45). R-values for insulation shown in parentheses, based on 75° F. mean temperature for insulation and components.

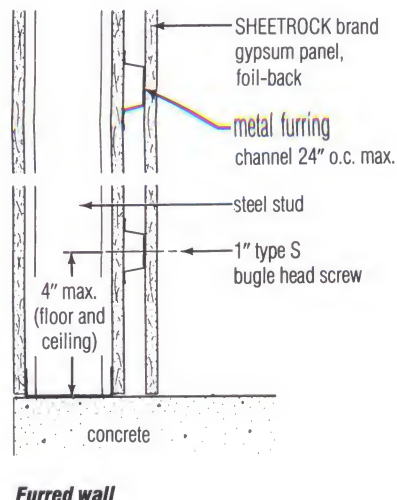
Exterior Wall Furring

With UNIMAST Steel Studs

Free-standing furring consists of steel studs erected vertically between floor and ceiling runners. Studs are attached to runner flanges with metal lock fastener tool or screws. SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to one side of studs, serve as an easily decorated interior surface. This free-standing furring system provides maximum clear chase space and minimizes possibilities for photographing or shadowing to occur over fasteners and furring members.

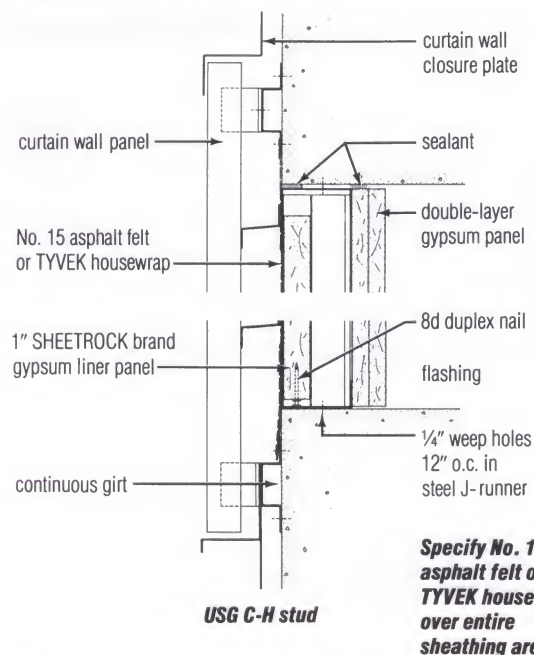


This assembly consists of stud framing which is secured to the exterior wall with brackets at mid-height when heights greater than 12'0" are required. The adjustable wall furring bracket is anchored to the exterior wall and attached to each stud web with a pan head framing screw. Furring providing greater height may be constructed with wider or heavier steel studs (see tables, page 7).



With USG C-H Stud Framing

An alternate framing system uses USG C-H Studs, J-Runners and SHEETROCK brand Gypsum Liner Panels, quickly erected from one side to provide sturdy fire-rated backup curtain walls. Studs and runners are available in 2½" and 4" widths. SHEETROCK brand Gypsum Liner Panels have a special fire-resistant core encased in water-resistant paper. System provides wall heights to 15'3", wind loads to 40 psf. All components except curtain wall skin may be erected from inside the building.



Exterior wall framing—USG C-H stud

Limiting heights with interior and exterior facing⁽¹⁾

Design criteria	Defl. limit	Stud spacing (in o.c.)	Limiting heights for steel studs by size and gauge		
			2½" 212 CH22	2½" 212 CH20	4" 400 CH20
15 psf	L/240	12	11'9"	13'0"	15'3"
		24	10'3"	10'9"	12'6"
	L/360	12	10'3"	11'3"	13'6"
		24	9'10"	9'6"	11'0"
20 psf	L/240	12	10'6"	11'9"	14'0"
		24	9'0"	9'9"	11'6"
	L/360	12	9'3"	10'3"	12'3"
		24	8'3"	8'6"	10'0"
25 psf	L/240	12	9'9"	11'0"	13'0"
		24	8'0"	9'0"	10'6"
	L/360	12	8'6"	9'6"	11'3"
		24	—	8'0"	9'3"
30 psf	L/240	12	9'3"	10'3"	12'3"
		24	—	8'3"	9'6"
	L/360	12	8'0"	9'0"	10'6"
		24	—	—	8'9"
35 psf	L/240	12	8'9"	9'9"	11'6"
		24	—	—	8'0"
	L/360	12	—	8'6"	10'0"
		24	—	—	8'0"
40 psf	L/240	12	8'6"	9'3"	11'0"
		24	—	—	—
	L/360	12	—	8'3"	9'9"
		24	—	—	—

(1) Any independently supported exterior treatment; interior is two layers of ½" SHEETROCK brand Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly without exterior finish.

Good Design Practices—**Interior Steel Framed Walls and Ceilings**

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on company products assembled to meet performance requirements of established test procedures specified by various agencies. *System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.*

2 Shadowing and Spotting—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A** The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c. (see detail, page 30).
- B** On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to interior side of wall and finish with SHEETROCK brand Gypsum Panels, Foil-Back, (see detail, page 28).
- C** For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.

3 Control Joints—Gypsum panel surfaces should be isolated with control joints or other means where:

- A** partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling;
- B** ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration;
- C** construction changes within plane of partition or ceiling;
- D** partition or furring run exceeds 30';
- E** ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief;
- F** exterior soffits exceed 30' in either direction;
- G** wings of "L," "U" and "T"-shaped ceiling areas are joined;
- H** expansion or control joints occur in the exterior wall.
- I** Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.

SHEETROCK Zinc Control Joints, when properly insulated and backed by gypsum panels, have been fire-endurance tested and are certified for use in one- and two-hour fire-rated walls (see page 10 for construction details).

4 Metal Door and Borrowed-Light Frames should be at least 18-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 16-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in a jamb (see details, page 10). Stud reinforcing described below is screw-attached to jamb anchors. Three-piece frames may also be used with these partitions provided end of partition floor runner is anchored with

two suitable fasteners.

For standard doors up to 3'0" wide weighing not more than 100 lb., ST25 steel studs and runners may be used for framing the opening. For doors 2'8" to 4'0" wide (200 lb. max.) rough framing should be ST20 studs (3½" min.) and runners. For heavy doors up to 4'0" wide (300 lb. max.), two ST20 studs should be used (see details, page 10). For doors over 4'0" wide, double doors and extra-heavy doors (over 300 lb.), framing should be specially designed to meet load conditions. Rough framing for all doors in fire-rated partitions should be ST20 studs and runners.

For added door frame restraint, spot-grouting at the jamb anchor is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound just before inserting board into frame; do not terminate gypsum panel against trim return.

5 Pipe and Conduit Chases—Additional chases can be provided in steel studs by cutting round holes up to ¼ of stud width, spaced 12" apart.

6 Ceramic Tile—SHEETROCK brand Gypsum Panels, Water-Resistant, or DUROCK Interior Cement Boards are recommended as a base on walls for adhesive application of ceramic and plastic tile and plastic-faced wall panels. Double-layer panels are required for resilient systems.

7 Fixture Attachment—Lightweight fixtures should be installed with toggle bolts or hollow wall anchors inserted in the panel and preferably, also through the stud. Wood or metal mounting strips for cabinets and shelving should be bolted to the stud framing (see page 13).

8 Wood Base—Apply with trim head screws placed at each stud and midway between studs (12" o.c.).

9 Sound Tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with a ¼" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes and plumbing, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided.

10 TEXTONE Vinyl-Faced Gypsum Panels—For adhesive applications, only water-based adhesives are recommended; other adhesives may not be compatible with the vinyl surface.

Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall and the resultant damage to the vinyl covering.

11 Ceilings—Spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported. Lighting fixtures or troffers, air vents and other equipment should be separately supported from the ceiling grid or structure above; gypsum panels will not support these items. To prevent objectional sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for ½" thick panels with frame spacing 24" o.c., 2.2 psf for ¾" panels on 16" o.c. framing and ¾" panels on 24" o.c. framing. Foil-back panels or a separate vapor retarder should be installed in all roofed ceilings, and the plenum or attic space vented with a min. ½-sq. in. net free vent area per sq. ft. of horizontal surface. Framing for exterior soffits should provide resistance to wind uplift.

- 12 Fire-Rated Ceilings**—To comply with UL Floor-Ceiling Designs G512 and G515, gypsum panel end joints should be aligned and backed by 2" or 2½" wide face panel strips respectively laid over the joints. Face panels should be fastened to continuous furring channels centered 2" or 3" either side of joints. For UL Designs J502, J503, and J504, end joints should be backed by 3" wide strips and furring channels centered 3¼" either side of joints.
- 13 Back-Blocking** of ceiling end joints is recommended when construction occurs during adverse job or weather conditions. Float end joints between furring channels and back-block joint with a continuous 8" face panel strip adhesively applied, or screw-attach floated ends to a 5' channel centered over joint.
- 14 Acoustical Tile**—Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.
- 15 SHEETROCK brand Exterior Gypsum Ceiling Board**—Exposed surfaces should receive two coats of good quality exterior paint. First coat: oil-based primer; second coat: either alkyd or latex exterior paint.
- 16 Furring Systems**—Shallow electrical outlet boxes are recommended when insulation less than 1½" thick is used.
- 17 Warning: Combustible.** Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.
- 18 High-Rise Buildings**—Variable wind pressure can cause a structure to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause, or repair of these job-related noises.
- 19 Additional Information**—For additional information and product limitations, see technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels and Accessories Folder SA-927* for information on system components; *Texture and Finish Products Folder SA-933* for finishing product specifications; *Plaster Products, Systems and Accessories Folder SA-920* for information on veneer finish products; *DUROCK Interior Cement Folder SA-932* for data on ceramic tile base. See *UN-30 UNIMAST Steel Framing Systems: Technical Information* for data on steel products.

Good Design Practices—

Exterior Steel Framed Walls and Ceilings

- 1 System Performance**—These design practices are for exterior non-load bearing curtain wall systems using steel framing and securely attached interior and exterior facings. They are presented as a general guide to the architect or structural engineer in preparing project specifications. The architect and/or structural engineer must determine what specific products and systems are appropriate for use in a given structure.
- United States Gypsum Company will provide test certification for published fire and sound data covering products used according to its published specifications. Tests are conducted on United States Gypsum Company and Unimast Incorporated products assembled to meet performance requirements of established test procedures specified by various agencies. *System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*
- 2 Design Considerations**—Simple span limiting heights for SJ studs found in tables are calculated assuming web crippling strength based on test data for studs with min. 10" length of unpunched web steel at both ends of member, for 20-ga. and 18-ga. members having equal stud and runner gauge thickness, and for 16-ga. and 14-ga. studs using 18-ga. runner and with the physical and structural properties described. When field cuts reduce this minimum 10" unpunched steel, web stiffening may be required. For simple span limiting heights based on stud properties only, table values assume full lateral bracing of both stud flanges. Recommendations contained herein cover brick veneer that is structurally supported at every floor with a soft joint below the ledger angle or veneer that is designed per the Brick Institute of America Technical Notes 28 and 28B. Adjustable masonry ties are recommended when continuous brick veneer must be isolated from the structural elements. For low-rise construction and where vertical displacement is not a problem as determined by the architect and/or structural engineer, an 18-ga. galvanized corrugated tie may be determined to be suitable. In all continuous curtain wall by-pass construction, contact United States Gypsum Company for slide clip, welding, load and all property and framing performance data.
- 3 Fasteners**—Specify drywall screws for 25-ga. to 20-ga. steel framing. Specify self-drilling screws for 20-ga. to 14-ga. steel framing. On interior of exterior wall, specify Type S-12 for 20-ga. framing. Corrosion-resistant screws must be used for screw-attaching all sheathing, metal lath, brick ties and other exterior materials.
- 4 Window and Door Openings**—Framing for window, door and other wall penetrations must have additional studs or reinforcement at the header, sill and jambs to transfer and support all applicable loads. Design should be checked for structural adequacy. Spot grout exterior door frames with portland cement plaster.
- 5 Shadowing**—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing, one of the following alternatives should be considered:

- A** The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c. (see detail, page 30).
- B** For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior studs and membrane.

6 Expansion and Contraction—Curtain wall surfaces should be isolated with control joints or other means where:

- A** curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;
- B** construction changes within the plane of the wall;
- C** stucco surfaces exceed 10' in either direction;
- D** the area within stucco sections exceeds 100 sq. ft.;
- E** as required for brick-veneer construction by the Brick Institute of America especially below ledger angle supports;
- F** basic construction contains a control joint;
- G** interior partition run exceeds 30';
- H** exterior soffits exceed 30' in either direction.
- I** Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

Framing at control joints that extend through the wall should have 1½" cold-rolled channel alignment stabilizers spaced max. 5'0" vertically. Channels should be placed through holes in the stud web and be securely attached to the first stud either side of the control joint.

Control joint assemblies, suitable for wind pressures up to 40 psf, that meet ASTM E514, Class E water permeance requirements, should have 2" wide butyl tape applied to the sheathing under the control joint. For wind pressures up to 20 psf, backing should have 6" wide horizontal overlap in the asphalt felt sheathing covering and 6" wide asphalt felt strips placed vertically behind the control joint (see page 26 for details).

- 7 Air and Water Infiltration**—Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall. All gypsum sheathing must be covered with No. 15 asphalt felt or TYVEK Housewrap sheet to assure water-tight construction. Asphalt felt should be applied horizontally with 2" overlap and attached to sheathing. TYVEK sheet should be stapled to sheathing according to manufacturer's directions. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c.

- 8 Corrosive Materials**—Zinc alloy accessories are recommended for exterior applications and where corrosion due to high humidity and saline content of aggregate is possible. Metal lath, control joints and other metal accessories, including zinc alloy accessories, should not be used with magnesium oxychloride cement stuccos or portland cement stucco with calcium chloride additives.

- 9 Prefinished Panels**—Ceramic, aggregated or porcelain-enameled panels, metal siding and other dry exterior facings weighing up to 8 psf may be applied over gypsum sheathing and screw attached to studs. Use stainless steel screws, clips, hanger bars and fastening methods according to siding manufacturer's recommendations. Screws should not transfer more than 15 lb. panel weight per screw to studs. Screw lengths are based on panel thickness plus ⅞".

- 10 Additional Information**—See product folders in this series: *Gypsum Panels & Accessories Folder SA-927* for information on system components; *Texture and Finish Products Folder SA-933* for finishing specifications; *Plaster Products, Systems and Accessories Folder SA-920* for plaster system components and specifications; *THERMAFIBER Life Safety Fire Containment Systems Folder SA-707* for data on insulation and mineral fireproofing. See *UN-30 UNIMAST Steel Framing Systems: Technical Information* for data on steel products.

- 11 WARNING: COMBUSTIBLE.** Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.

- 12 High-Rise Buildings**—Variable wind pressure can cause a structure to drift or sway. This can result in movement of the non-load bearing partitions, thus causing noise. United States Gypsum Company assumes no responsibility for the prevention, cause, or repair of these job-related noises.

- 13 Vapor Retarders**—Vapor retarder is normally installed on the warm side of wall in cold climates to prevent interior moisture from entering the stud cavity. Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall. Vinyl wall coverings are not recommended for the interior of walls containing vapor retarders.

- 14 Note**—United States Gypsum Company reserves the right to discontinue, make improvements in, or change materials and/or configurations of any of its products described in this Folder, without prior notice and without obligation to incorporate the changes or improvements in items already manufactured. Consult your United States Gypsum Company sales representative for current product information and details.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed instructions.

All studs, runners and other accessories identified as Unimast products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70° F. (13° to 21° C). Adequate ventilation shall be provided to carry off excess moisture.

SHEETROCK Setting-Type Joint Compound and SHEETROCK Joint Tape shall be used on all joints and internal corners and allowed to set and dry thoroughly before plaster application when used in conjunction with veneer plaster over steel framing.

Part 2: Products

A Metal Furring Materials

UNIMAST Metal Furring Channel (DWC-25)(DWC-20)
UNIMAST Metal Furring Channel Clip (use with DWC-25 only)
SHEETROCK Z-Furring Channel (1")(1 ½")(2")(3")
RC-1 Resilient Channel
¾", 1½" UNIMAST Cold-Rolled Channel (ptd)(galv)
UNIMAST Adjustable Wall Furring Bracket

B Metal Trim

SHEETROCK Metal Trim No. (200-A)(401)(402)(P-1)(801-A)(801-B)

C Corner Reinforcement

(No. 103 DUR-A-BEAD Corner Bead)(No. 800 Corner Bead)

D Metal Angle

UNIMAST Metal Angle, 1½"x 7/8"x24-ga.

E Control Joint

SHEETROCK Zinc Control Joint No. 093

F Hanger Wire

UNIMAST Galvanized Hanger Wire, 9-ga.

G Tie Wire

UNIMAST 18-ga. Galvanized Tie Wire

H Steel Studs

USG Steel C-H Studs:
212CH25 (2½")
212CH22 (2½")
212CH20 (2½")
400CH20 (4")
400CH25 (4")
USG Double E Studs:
600ES25 (6")
600ES20 (6")

I Steel Runners

USG J-Runners:
212JR24 (2½")
212JR20 (2½")
400JR24 (4")
400JR20 (4")
600JR24 (6")
600JR20 (6")

J Interior Steel Studs and Runners

UNIMAST Steel Studs—158ST25 (1½"), 212ST25 (2½"), 358ST25 (3½"), 400ST25 (4"), 600ST25 (6"), 212ST22 (2½"), 358ST22 (3½"), 400ST22 (4") 600ST22 (6"), 212ST20 (2½") 358ST20 (3½"), 400ST20 (4"), 600ST20 (6"), 362SJ20 (3½"), 40SJ20 (4").
UNIMAST Steel Runners—158CR25 (1½"), 212CR25 (2½"), 358CR25 (3½"), 400CR25 (4"), 600CR25 (6"), 212CR22 (2½"), 358CR22 (3½"), 400CR22 (4"), 600CR22 (6"), 362CR20 (3½"), 400CR20 (4").

K Exterior Steel Studs and Runners

UNIMAST ST Style Studs—212ST20 (2½") 358ST20 (3½") 400ST20 (4"), 600ST20 (6")

Note: Select CR20 Runner to match stud style.

UNIMAST SJ Style Studs—362SJ20 (3½"), 362SJ18 (3½"), 362SJ16 (3½"), 362SJ14 (3½"), 40SJ20 (4"), 40SJ18 (4"), 40SJ16 (4"), 40SJ14 (4"), 60SJ20 (6"), 60SJ18 (6"), 60SJ16 (6"), 60SJ14 (6"), 725SJ18 (7¼"), 725SJ16 (7¼"), 725SJ14 (7¼") 80SJ18 (8"), 80SJ16 (8"), 80SJ14 (8")

UNIMAST Runners—Select CR-runner to match stud style. CR18 styles may be used with SJ16 and SJ14 studs.

L Metal Lath

UNIMAST 3.4-lb. Galvanized Self-Furring Junior Diamond Mesh Lath, 27" x 96".

M Lathing Accessories

(specify from Plaster Products, Systems & Accessories SA-920; specify 1" exterior grounds; 1" casing beads available by special order from United States Gypsum Company).

N Screws

size: (¾") (7/16") (½") (1") (1¼") (1 ½")(1¾")(2")(2¼")(2½")(3")
style: (framing—Type S or S-12)(drywall—Type S)(self-drilling—Type S-12)(laminating—Type G)(coarse thread—Type W) head: (bugle)(pan)(trim)(pancake)(low-profile)(mod. truss head) coating: (reg)(corrosion-resistant).

O Gypsum Panels

Faceboards—(½")(¾") thick, 48" wide SHEETROCK brand (Regular) (Foil-Back)(FIRECODE C)(Water-Resistant, FIRECODE) Gypsum Panels, Textone Vinyl-Faced Gypsum Panels, SHEETROCK brand Exterior Gypsum Ceiling Board, ½" thick SHEETROCK brand Interior Gypsum Ceiling Board, lengths as required.

Backing Boards—Regular SHEETROCK brand Gypsum Panels (½")(¾") thick, 48" wide, lengths as required (for furred wall construction).

Gypsum Base—Foil-Back IMPERIAL Gypsum Base (for veneer plasters) ½" thick in Regular and FIRECODE C, ¾" in Regular, FIRECODE, and FIRECODE C.

Sheathing—SHEETROCK brand Gypsum Sheathing—½" thick, (2', 4'x8'); (4'x9'); GYP-LAP Gypsum Sheathing—½" thick, (2'x8'), (4'x8', 9'); SHEETROCK brand Gypsum Liner Panels—1" thick, 2' x lengths to 14', (for use with C-H Stud Infill Panel System).

P Plasters

(specify plasters for interior surfaces from Plaster Products, Systems & Accessories SA-920).

Q Insulation

THERMAFIBER Fire Safety FS-15 Blankets—(3") (3 $\frac{5}{8}$ ") thick, (16") (24") wide x (48") (96") long or THERMAFIBER CW-40 Insulation (1") (1 $\frac{1}{2}$ ") (2") thick, (16") (24") wide x 60" long.

THERMAFIBER Sound Attenuation Fire Blankets—(1 $\frac{1}{2}$ ") (2") (3") thick, x (16"x48") (24"x48"). (Use where noncombustibility is required. Specify foil-back interior gypsum or IMPERIAL Base panels for vapor retarder.)

THERMAFIBER Safing Insulation—(2") (4") thick, 24" wide, () long, 4 pcf min. density, (with foil facing) (with galvanized steel impaling clips) (with fire-resistant adhesive).

THERMAFIBER CW-40 Curtain Wall Insulation—(2") (3") (4") thick, 24" wide, (36") (48") (60") long (Regular) (Foil-Faced).

R Joint Treatment

Specify Joint Treatment Systems for interior surfaces from Gypsum Products, Systems & Accessories SA-919 (in Sweet's General Building and Renovation file, section 09250) or Gypsum Panels & Accessories SA-927.

S Adhesives

SHEETROCK Setting-Type Joint Compound or SHEETROCK Ready-Mixed Joint Compound for double-layer application and column fireproofing (All Purpose) (Taping)

T Exterior Stucco Finish and Stucco Lime

ORIENTAL Exterior Stucco
BONDCRETE Mason's and Stucco (ASTM C207 Type S)
Air Entraining Mason's and Stucco Lime (ASTM C207 Type S)

U Caulking

SHEETROCK Acoustical Sealant

V Portland Cement-Lime Stucco

Mixed in accordance with ASTM C926. Proportions: scratch coat—1 bag cement: $\frac{3}{4}$ to 1 bag BONDCRETE Lime: 5 to 6 cu. ft. sand; finish coat—1 bag cement: 2 bags lime: 7 to 10 cu. ft. sand.

W Masonry Materials

Masonry Units—Brick, face (ASTM C216) or common (ASTM C62), having a min. compressive strength of 2,000 psi tested per ASTM C67. Other units specified by the architect meeting ASTM C126, C652 or approved by authorities having jurisdiction may be used.

Mortar—Portland cement-lime mortar (Type S, 1: $\frac{1}{2}$:4 $\frac{1}{2}$ mix) or (Type N, 1:1:6 mix) (ASTM C270) (Masonry cement mortars shall not be used) Brick ties (18-ga. corrugated G-90 galvanized coating) (adjustable wire type) or as specified. Refer to Section 4.1.6.

X Runner Fasteners

$\frac{3}{32}$ " dia. power-driven type with (1 $\frac{1}{4}$ ") (1 $\frac{1}{2}$ ") penetration into 3,000 psi concrete; 1 $\frac{1}{16}$ " Type S-12 Pilot Point for attaching $\frac{3}{4}$ " plywood to 18-ga. C-closure.

Y No. 15 Asphalt or TYVEK Housewrap Sheet

Z Sealants

Butyl Tape— $\frac{3}{16}$ " thick, 100% solid polymeric, non-staining, butyl-based sealant tape.

Other Sealants—architectural and/or vapor sealants specified by architect.

Part 3: Interior Steel Framed Wall and Ceiling Erection

3.1 Partition Installation

3.1.1 Stud System Erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c. To suspended ceilings, use toggle bolts or hollow wall anchors spaced 16" o.c.

Position studs vertically, with open side facing in same direction, engaging floor and ceiling runners, and spaced 24" o.c. When necessary, splice studs with 8" nested lap and two positive attachments per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, corners and free-standing furring to ceiling and floor runner flanges with metal lock fastener tool or screws. Securely anchor studs to jamb and head anchors of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bend at each end, and secure to strut-studs with two screws in each bent web. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header. When attaching studs to steel grid system, structural adequacy of grid to support end reaction of wall must be determined.

3.1.2 Resilient Channel Erection

Position RC-1 Resilient Channel at right angles to steel studs, space 24" o.c. and attach to stud flanges with pan head framing screws driven through holes in channel mounting flange. Install channels with mounting flange down. (Channel may be inverted at floor to accommodate attachment of base.) Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Cantilever channel ends no more than 6". Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

3.1.3 Sound Attenuation Fire Blanket Installation

Install THERMAFIBER Sound Attenuation Fire Blankets after gypsum panels are applied to the resilient channel and before panels are applied to other side of studs. Insert the 25" wide blanket in the stud cavity, by bowing the blanket slightly. After inserting, make a vertical cut between the studs. Slit the blanket with a sharp utility or hook-bill knife to ease the pressure of the blanket against the gypsum panels when they are installed. Butt ends of blankets closely together and fill all voids.

3.1.4 Gypsum Panel Erection

Apply gypsum panels (parallel to studs) (perpendicular to studs). Position all edges over studs for parallel application; all ends over studs for perpendicular application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

Screw spacing that follows is for non-rated construction. For fire-rated construction, obtain screw spacing from fire test report or table on page 6.

For single-layer parallel application of gypsum panels, space screws 16" o.c. in field of panels and along vertical abutting edges. For perpendicular panel application, space screws 16" o.c. in field and along abutting end joints.

For single-layer adhesive application, pre-bow panels and attach vertically to studs using $\frac{3}{8}$ " continuous adhesive beads applied to face of studs. Apply one bead to intermediate studs and two beads to studs occurring at panel joints. Secure panel at top and bottom with 1" Type S screws spaced 16" o.c. Impact panel along each stud to insure good contact at all points.

For double-layer screw attachment, space screws 24" o.c. in base layer and 16" o.c. in face layer. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints by at least one stud. On tall walls, offset end joints also. For $\frac{1}{2}$ " and $\frac{5}{8}$ " panels, use 1" screws for base layer and 1 $\frac{1}{2}$ " screws for face layer.

For double-layer laminated construction, attach base layer with 1" screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply face layer vertically with specified SHEETROCK Setting-Type (DURABOND) Joint Compound or SHEETROCK Ready-Mixed Joint Compound spread on back side, joints staggered approx. 12" and fastened to base layer with 1½" laminating screws. Drive screws approx. 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 2" from vertical edges. Temporary shoring or support installed 16" to 24" o.c. until adhesive is dry may be used in place of screws.

For double-layer laminated non-rated construction, attach base layer with 1" Type S screws spaced 16" o.c. at joint edges and in the field of panel. Apply laminating adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four ¼"x ¼" min. notches spaced max. 2" o.c. Position wall panels vertically, press into place with firm pressure to insure bond and fasten top and bottom as required. For ceiling panels, space fasteners 16" o.c. along edges and ends; install one permanent field fastener per framing member at mid-width of panel.

For resilient construction, apply gypsum panels with long dimension perpendicular to resilient channels and fasten with 1" Type S screws spaced 12" o.c. along channels. Where channel resiliency makes screw placement difficult, the next longer screw may be used but do not drive screw directly over stud.

3.1.5 SHEETROCK brand Gypsum Panels, Water-Resistant, Erection

A Framing—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over ⅝" thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.

B Gypsum Panels—After tub, shower pan or receptor is installed, place temporary ½" spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, brush thinned tile adhesive over all cut or exposed panel edges at utility holes, joints and intersections.

Install panels perpendicular with paperbound edge abutting top of spacer strip. Fasten panels with screws 12" o.c. max. Where ceramic tile more than ⅝" thick will be used, space screws 8" o.c. max.

In areas to be tiled, treat all fastener heads with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. Fill tapered edges in gypsum panel with this SHEETROCK Setting-Type Compound, embed SHEETROCK Joint Tape firmly and wipe off excess compound. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

In areas not to be tiled, embed tape and treat fasteners with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound applied in the conventional manner. Finish with at least two coats of setting-type joint compound applied according to directions.

Prior to tile erection, seal cut panel edges of all openings around pipes, fittings and fixtures with thinned tile adhesive. Remove spacer strips, but do not caulk gap at bottom of panels.

Note—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between the tile and shower floor or tub.

3.2 Chase Wall Erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power-driven anchors 24" o.c., to suspended ceilings with toggle bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position steel studs vertically in runners, 24" o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Except in fire-rated walls, anchor studs to floor and ceiling runner flanges with metal lock fastener tool or screws per paragraph 3.1.1.

Cut cross bracing made from gypsum panels, 12" high by chase wall width. Place between rows of studs. Space braces 48" o.c. vertically and attach to stud webs with six 1" Type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side.

Bracing of 2½" steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two ⅝" pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2½" runner screw-attached to chase wall studs within the cavity.

3.3 Curved Partition Installation

3.3.1 Framing Erection

Cut top and bottom runner through leg and web at 2" intervals for arc length. Allow 12" uncut straight runner at each end of arc. Bend runners to uniform curve of specified radius. Clinch a 1"x25-ga. steel strip to inside of cut leg using metal lock fastener. Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c. To suspended ceilings, use toggle bolts or hollow wall anchors spaced 16" o.c.

Position studs vertically, with open side facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along outside of arc. Secure studs to runners with ⅝" pan head framing screws. On tangents, place studs 6" o.c. leaving last stud freestanding. Install balance of stud system in normal manner according to specifications.

3.3.2 Gypsum Panel Preparation

Select length and cut panel so one unbroken panel covers curved surface and 12" tangents at each end. Outside panel must be longer than inside panel to compensate for additional radius contributed by studs.

When wet panels are required, evenly spray water per manufacturer's directions on the surface to be compressed when panels are hung. Carefully stack panels with wet surfaces facing each other and cover stack with a polyethylene sheet. Allow panels to set at least one hour before application.

3.3.3 Gypsum Panel Erection

Apply gypsum panels horizontally with the wrapped edges perpendicular to studs. On the convex side of the partition, begin installation at one end of the curved surface and fasten panel to studs as it is wrapped around the curve. On the concave side, start fastening panel to the stud at the center of the curve and work outward to the panel ends. Fasten single-layer panels with 1" Type S screws spaced 12" o.c.

For double-layer application, apply base layer horizontally and fasten to stud with 1" Type S screws spaced 16" o.c. Center face layer panels over joints in the base layer and secure to studs with 1½" Type S screws spaced 12" o.c. Allow panels to dry completely before applying joint treatment.

3.4 Drywall Soffit Erection

Attach steel runners 24" o.c. to concrete slabs with concrete stud nails or power-driven anchors, to suspended ceilings with toggle bolts or to wood framing with suitable fasteners. On stud walls, space fasteners to engage each stud. On ceilings, place fastener close to outside face runner. Fasten vertical face panel to web of face corner runner and flange of ceiling runner with 1" screws spaced 12" o.c. For braced furring, insert steel studs between face corner runners, sidewall and ceiling runners and attach studs to runners with metal lock fastener tool or pan head framing screws. Attach face panels to steel studs and runners with 1" screws spaced 12" o.c. Space screws in corner runner at least 1" from gypsum panel edge.

3.5 Ceiling Installation

3.5.1 Grillage Erection

Space 9-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying-channel run. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install 1½" carrying channels 48" o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 18-ga. tie wire.

Erect metal furring channels at right angles to 1½" carrying channels or main supports. Space furring (16") (24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or wire-tie to supports with double-strand 18-ga. wire. At splices, nest furring channels at least 8" and securely wire-tie each end with double-strand 18-ga. wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.5.2 Steel Stud Framing System Erection

Attach runners at ceiling height, through gypsum panels, to each partition stud with two screws. Insert steel studs in runners and attach each end with one pan head framing screw. Install 1½" stud cross-bracing over stud framing, space 48" o.c. and attach to each framing stud with two pan head framing screws. At hangers, install 12" long stud section for box reinforcing or lap studs 12" and secure each end with two pan head framing screws.

At light troffers or any openings that interrupt the ceiling, install additional cross reinforcing to maintain structural integrity of framing.

3.5.3 Gypsum Panel Erection

Apply gypsum panels of maximum practical length with long dimension perpendicular to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" Type S screws spaced 12" o.c. in field of panels and along abutting ends and edges.

3.6 Caged Beam Fireproofing

Position ceiling runners at least ½" from and parallel to beam and fasten to floor units with ½" Type S-12 pan head screws spaced 12" o.c. Fabricate hanger brackets from 1½" steel runners allowing (½") (1") clearance at bottom of beam. Space brackets 24" o.c. along beam and attach to ceiling runners with ½" Type S-12 screws. Install lower corner runners parallel to beam and fasten to brackets with ½" Type S-12 screws.

Attach (two) (three) layers of ½" SHEETROCK brand Gypsum Panels, FIRECODE Core, to channel brackets with screws. Install vertical panels first, with bottom panels overlapping lower edges of panels in each layer. Attach panels to channel brackets with (1") (1½") Type S screws 16" o.c. for base layer, 1½" Type S screws 12" o.c. for middle layer and (1½") (2½") Type S screws 8" o.c. for face layer. For 3-hour assembly, install wire mesh over bottom middle layer panel, extend 1½" up each side and fasten with 1½" screws used to fasten panels.

3.7 Column Fireproofing Installation

3.7.1 UL Design X518-2 hr.

Attach inner layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, to 1½" steel studs with 1" Type S screws spaced 24" o.c. and place assembly with gypsum panel next to column flange. Install gypsum panel layer vertically around column using 1" Type S screws to attach base layer to stud web 24" o.c. and face layer to stud flange 12" o.c. Apply face layer vertically over web face side of column and fasten through base layer to web of studs with 1½" Type S screws spaced 12" o.c. and staggered from screws in base layer. Apply corner bead at all corners, fasten with 1" Type S screws 9" o.c. and finish with joint compound.

3.7.2 UL Designs X521-2 hr. & X514-3 hr.

For all W14 x 228 steel columns, provide fire protection with ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied vertically over 1½" steel studs positioned at corners. Attach panels to studs with 1" Type S screws spaced 12" o.c. For 3-hour rating install additional layer over web surface and attach to studs with 1½" Type S screws spaced 12" o.c. Apply corner bead at all corners and finish with joint compound.

3.7.3 UL Design X515-3 hr.

Attach inner layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, to 1½" steel studs with 1" Type S screws spaced 12" o.c. and place assembly with gypsum panel next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten base layers with 1" Type S screws, middle layers with 1½" screws and face layers with 2½" screws. Space all screws 12" o.c. vertically. Apply corner bead at corners; finish with joint compound.

3.7.4 UL Design X507-4 hr.

For all W14 x 228 steel columns, provide fire protection with double-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied vertically over 1½" steel studs positioned at corners. Attach base layer to studs with 1" Type S screws spaced 12" o.c. and attach face layer with 1½" Type S screws spaced 12" o.c. and staggered 6" from base layer screws. Apply corner bead at corners; finish with joint compound.

3.7.5 UL Design X524-2 hr.

Provide fire protection to all columns with three layers ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to 1½" steel studs positioned at column corners. Cut studs ½" to ¾" less than column height. For columns having depth of 36" or less, apply panels vertically and stagger joints between layers at least 30".

When column depth exceeds 36", install additional 1½" studs in each web recess inside and along column flanges and at the web center. Set studs in runners placed horizontally, parallel to web between column flanges and spaced max. 8" o.c. vertically. Fasten studs to runners at top and bottom with ½" Type S-12 pan head screws. Apply gypsum panels horizontally and stagger joints between layers at least 12".

3.8 Wall Furring Installation

3.8.1 Direct Furring Channel Attachment

Attach metal furring channels (vertically) (horizontally), spaced 24" o.c., to interior of masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24" o.c. on opposite flanges. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

Apply gypsum panels (parallel to channels) (perpendicular to channels). Position all edges over furring channels in parallel application; all ends over framing in perpendicular application with joints staggered in successive courses. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" Type S screws spaced 16" o.c.

3.8.2 Mechanical Application—SHEETROCK Z-Furring Channels

Erect insulation vertically and hold in place with SHEETROCK Z-Furring Channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner. On adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with a standard width insulation panel and continue in regular manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold mineral-fiber insulation in place until gypsum panels are installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment of fixtures and furnishings.

Apply gypsum panels parallel to channels with vertical joints occurring over channels. Use no end joints in single-layer application. Attach gypsum panels with 1" Type S screws spaced 16" o.c. in field of panels and at edges, and with 1½" Type S screws spaced 12" o.c. at exterior corners. For double-layer application, apply base layer parallel to channels, face layer either perpendicular or parallel to channels with vertical joints offset at least one channel. Attach base layer with screws 24" o.c. and face layer with 1½" screws 16" o.c.

3.9 Accessory Application

- A Joint System**—Finish all face panel joints and internal angles with a United States Gypsum Company joint system installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- B Laminating Adhesive**—Spread to provide ½" adhesive beads 4½" o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips to center along both edges of face panel with metal spreader having ¼"x ¼" min. notches spaced max. 2" o.c.
- C Corner Bead**—Reinforce all vertical and horizontal exterior corners with corner bead fastened with ⅝" galvanized staples 9" o.c. on both flanges along entire length of bead.
- D Metal Trim**—Where assembly terminates against masonry or other dissimilar material, apply metal trim over panel edge and fasten with ⅝" galvanized staples 9" o.c.
- E P-1 Vinyl Trim**—Slip trim over panel with long flange behind panel. Install panel with trim firmly abutting surface.
- F Screws**—Power-drive at least ⅜" from edges or ends of panel to provide uniform dimple ½" deep.

- G Control Joints**—Break panel behind joint and back by double framing members (and 2" wide gypsum panel strip). Apply acoustical sealant to fill gap and attach control joint to face layer with ⅝" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Part 4: Exterior Steel Framed Wall Erection

4.1 Erection

4.1.1 Studs and Runners

- A** Align runners accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced () o.c. *Specify from table on page 23.*
- B** Position studs vertically in runners and space no greater than (12") (16") (24") (*choose spacing from Technical Data tables*). Securely anchor each stud to runner with four (⅝") (½") Type S-12 pan head or ⅝" Type S-12 low-profile head screws, two at top and two at bottom, with one screw in each flange.
- C** For the slip track system, allow ½" to ¾" clearance between top of studs and CR deep leg runner. Do not fasten studs to CR deep leg runner. Install 1½" cold-rolled channel lateral bracing within 10" to 12" of tops of studs. Connect bracing to each stud using welded or screw-attached clip angle.



4.1.2 Exterior Sheathing

Screw-attach SHEETROCK brand Gypsum Sheathing or GYP-LAP Gypsum Sheathing to exterior of each stud with 1" (drywall) (self-drilling) corrosion-resistant screws spaced $\frac{3}{8}$ " from ends and edges and approx. 8" o.c. Apply sealant around sheathing perimeter at interface with other materials and install flashing as indicated on the drawings. (Install asphalt felt horizontally with 2" overlap and 6" endlap and fasten with corrosion-resistant staples as specified.) (Install TYVEK sheet according to manufacturer's directions; fasten to sheathing with staples.) When stucco exterior will be applied, sheathing may be tacked in place with screws, since application of self-furring metal lath will complete sheathing anchorage. All sheathing tacked in this manner must be covered with metal lath immediately.

4.1.3 Exterior Metal Lath and Accessories

- A** Install SHEETROCK Zinc Control Joint No. 100 where indicated on the drawings. Back control joints with (2" wide butyl tape) (6" wide asphalt felt). Attach with Bostitch $\frac{3}{8}$ " "G" staples or equal, spaced 6" apart on each flange. Break supporting members and sheathing behind control joints. Apply sealant at all splices, intersections and terminals.
- B** Apply metal lath with long dimensions across supports, with ends lapped 1" and staggered in adjacent courses, sides lapped $\frac{1}{2}$ " and with lath over control joint flanges. Screw-attach self-furring metal lath through sheathing and felt to steel studs spaced 24" o.c. max. and runners with 1 $\frac{1}{4}$ " modified truss or pancake head corrosion-resistant screws 8" o.c. Screw-attach lath through control joint flanges and sheathing into studs.
- C** Apply other lathing accessories per Folder SA-920.

4.1.4 Exterior Stucco

Apply scratch coat and brown coats to full 1" thickness. Apply scratch coat with sufficient material and pressure to form good full keys on metal lath, then cross rake. After scratch coat has set firm and hard, apply brown coat to full grounds and straighten to a true surface. Leave rough for finish coat or matrix application or seed aggregate before brown coat has set.

4.1.5 C-H Studs and Runners

- A** Position J-Runners at floor and ceiling with short leg toward inside of wall and secure with power-driven fasteners spaced () o.c. *Specify from table on page 23.*
- B** Cut infill panels 1" less than floor-to-ceiling height. Drive two 8d duplex nails into bottom of gypsum liner panel, 4" from each edge, to support panel above runner (*see drawing, P. 30*). Install first gypsum liner panel, position C-H Stud on free end of panel, then continue alternate gypsum liner panel and stud applications to complete wall.

4.1.6 Masonry Materials

- A** Select masonry mortar, cavity width, mortar joint tooling requirements and erect per current applicable BIA technical notes in a workmanlike fashion per architect's specifications and details.
- B** Anchor brick with approved brick ties, screw-attached to each steel stud using two 1 $\frac{1}{4}$ " pancake head corrosion-resistant screws. Anchor other masonry units to each stud in a similar manner, 16" o.c. max. or as recommended by the Brick Institute of America. If corrugated brick ties are selected, anchor within $\frac{1}{2}$ " of bend.
- C** Support bricks with steel angles or concrete ledge at each floor or as approved by architect.

4.1.7 Other Dry Exterior Facings

Follow manufacturer's recommendations for application.

4.1.8 Insulation

- A** Apply 2' wide extruded polystyrene insulation horizontally with



tongue edge up, or 4' wide insulation vertically over gypsum sheathing covered with felt. Fasten panels to studs with Type S-12 wafer head insulation screws spaced max. 12" o.c. Use 2" length for 1" thick insulation, 2 $\frac{1}{2}$ " length for 1 $\frac{1}{2}$ " insulation, 3" length for 2" insulation. At wall perimeter and terminations, install screws 8" o.c. Cover framing with panels and fit joints tightly. For fire-rated construction, apply 2' wide extruded polystyrene insulation horizontally with tongue edge up over gypsum sheathing. Fasten 1" panels to studs with 2" Type S-12 wafer head insulation screws spaced 12" o.c. Cover sheathing with panels and fit joints tightly.

- B** Insert THERMAFIBER Fire-Safety FS-15 Blankets between studs and staple to the gypsum sheathing using $\frac{3}{8}$ " staples with divergent points placed at each corner and in center of each blanket, or friction-fit THERMAFIBER CW-40 Insulation between steel studs. Install THERMAFIBER Safing Insulation of proper size on (impaling clips) (support brackets) spaced as needed, 24" o.c. max., in safe-off area between curtain walls and floor slabs, leaving no voids.

4.1.9 Drywall Interior

- A** Position SHEETROCK brand Gypsum Panels, Foil-Back, FIRECODE Core, vertically or horizontally and attach to studs with 1" screws spaced 8" o.c.
- B** For furred interior construction, apply SHEETROCK brand Gypsum Panels vertically or horizontally and attach to studs with 1" screws 8" o.c. Over the first panel layer, apply metal furring channels horizontally 24" o.c. and screw-attach through panels into steel studs. Attach each channel attachment flange to each stud with 1" screws. Screw-attach a second layer of foil-back panels to furring channels with 1" screws spaced 12" o.c.
- C** Install drywall accessories, finish joints, accessories and screw heads per Folder SA-927.

4.1.10 Veneer Finish Interior

- A** Apply Foil-Back IMPERIAL Gypsum Base vertically or horizontally and attach to stud with 1" screws 8" o.c. Install veneer base interior immediately following gypsum sheathing application to properly resist design wind loads.
- B** Install lathing accessories and apply IMPERIAL Plaster per Folder SA-920.

Arizona: Phoenix, (602) 866-0795
California: Fremont, (415) 792-4400
 Glendale, (818) 956-1882
Florida: Jacksonville, (904) 764-3293
 Miami, (305) 557-4501
Georgia: Atlanta, (404) 393-0770
Hawaii: Honolulu, (808) 538-7712
Illinois: Chicago, (312) 606-5845
Indiana: Indianapolis, (317) 848-1513
Louisiana: New Orleans, (504) 241-2020
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Massachusetts: Charlestown, (617) 241-8530
Michigan: Southfield, (313) 569-1900
Minnesota: Bloomington, (612) 854-4233
Missouri: St. Louis, (314) 349-0980
New York: Albany, (518) 458-7437
 Oakfield, (716) 948-5287
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North Carolina: Charlotte, (704) 552-7402
Ohio: Chesterland, (216) 729-1956
Oregon: Beaverton, (503) 626-8864
Pennsylvania: Pittsburgh, (412) 341-2434
Tennessee: Nashville, (615) 361-8419
Texas: Dallas, (214) 490-0771
 Houston, (713) 666-0751
Utah: Salt Lake City, (801) 266-4975
Virginia: Richmond, (804) 285-7528
International Division: Chicago, (312) 606-5840

Technical Services: Contact the following offices for technical assistance concerning design, materials, systems, detailing and specifications.

Eastern Region: Atlanta, GA (404) 393-0770
 Tarrytown, NY (914) 332-8000
Western Region: Chicago, IL (312) 606-5788
 Glendale, CA (818) 956-1882

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 Chicago, Illinois 60606-4385
 A Subsidiary of USG Corporation

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09250

GYPSUM DRYWALL
 systems—steel frame



UNITED STATES GYPSUM COMPANY
 1992—1

New 2-Hr. and 4-Hr. Fire-Rated Steel Framed Systems

New 3/4" SHEETROCK brand Gypsum Panels, ULTRACODE Core, achieve a 2-hr. fire rating with single-layer construction

Description

In the past if a design specified a 2-hr. fire rating, a double-layer drywall system was required. Now the new 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, provides a 2-hr. fire-rating with single-layer construction. Also, 4-hr. fire-rated walls built with ULTRACODE Core panels require only double-layer construction compared to the previously required 4 layers of board.

These innovations in 2-hr. and 4-hr. system designs were made possible because of U.S. Gypsum Company's development of a new SHEETROCK brand Gypsum Panel with a specially formulated gypsum core—the *ULTRACODE Core*. And only ULTRACODE Core Gypsum Panels are classified by Underwriters Laboratories for the designs shown below.

Panels are 3/4" thick, 4' wide, and are available in 8', 9', 10' and 12' lengths (nonstandard lengths available with minimum quantities). Panel weight: 2.8 psf.

Reduced Labor Costs—Because only one 3/4" ULTRACODE Core panel layer is needed to achieve 2-hr. fire rating, the added labor of installing double layer systems is eliminated.

Reduced Material Costs—The number of fasteners required for 3/4" ULTRACODE Core panel installation is greatly reduced and the cost of joint treatment, sometimes used for sheet lamination or fire taping base layers in double-layer installations, is eliminated.

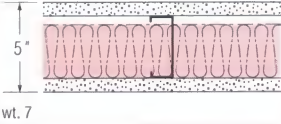
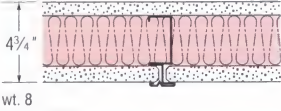
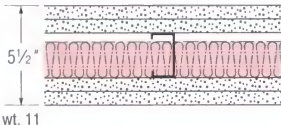
Panel Strength—Because of the ULTRACODE Core panel's added strength, it is an ideal product for use in partial height partitions where wall stiffness is critical. Also, panel edges are less prone to fastener blowouts, minimizing potential joint imperfections.

Fire Protection—Fire-rated systems include UL Designs U490, U491, and U492, all described below and in the Architectural Specifications.

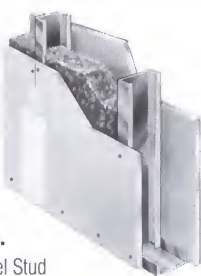
Faster Construction—The easily cut 3/4" ULTRACODE Core panels apply quickly, permit painting or other decoration, and the installation of trim, almost immediately. Contractors can get more work done in less time. Thus building occupancy and related revenues are realized sooner.

Sound Attenuation—The value of the ULTRACODE Panel systems is enhanced by excellent Sound Transmission Classification ratings.

Fire Test Data

Fire rating	Fire-rated construction		Acoustical performance	
	Detail & physical data	Description & test no.	STC	Description & test no.
2 hr.	 wt. 7	Steel stud—3/4" SHEETROCK brand Gypsum Panels, ULTRACODE CORE, ea. side—3/4" or 3/8" studs 24" o.c.—3" THERMAFIBER SAFB—panels vert appl & screw att 8" o.c. perim, 12" o.c. field—joints stag & fin—perimeter caulked— UL Des U491	50	USG-910617
2 hr.	 wt. 8	Cavity Shaft Wall—1" SHEETROCK brand Gypsum Liner Panels, set betw 4" USG Steel C-H Studs 24" o.c. one side—3/4" SHEETROCK brand Gypsum Panels, ULTRACODE Core, other side—3" THERMAFIBER SAFB—panels vert appl & screw att 8" o.c. perim, 12" o.c. field—joints stag & fin—perimeter caulked— UL Des U492	52	SA-910913
4 hr.	 wt. 11	Steel stud—2 layers 3/4" SHEETROCK brand Gypsum Panels, ULTRACODE Core, ea. side—2 1/2" studs 24" o.c.—2" THERMAFIBER SAFB—base layer app vert, joints stag, & screw att 24" o.c.—face layer app vert or horiz, & screw att 12" o.c.—att along horiz joints with Type G screws midway betw framing(24" o.c.)—joints fin—perimeter caulked— UL Des U490	56	SA-910907

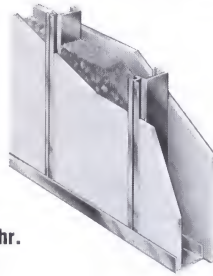
Steel Stud Assembly



UL Design U491—2 hr.

3/4" or 3/8" UNIMAST Steel Stud
3" THERMAFIBER SAFB
1 layer, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side

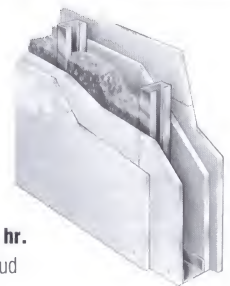
Cavity Shaft Wall Assembly



UL Design U492—2 hr.

4" USG C-H Steel Stud
3" THERMAFIBER SAFB
1 layer, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, one side
1 layer, 1" SHEETROCK brand Gypsum Liner Panel, other side

Steel Stud Assembly



UL Design U490—4 hr.

2 1/2" UNIMAST Steel Stud
2" THERMAFIBER SAFB
2 layers, 3/4" SHEETROCK brand Gypsum Panel, ULTRACODE Core, each side



New 3/4" SHEETROCK brand Gypsum Panels, ULTRACODE Core, cut down on installation time and reduce associated labor costs.

Good Design Practices

- 1 System Performance**—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on company products assembled to meet performance requirements of established test procedures specified by various agencies. *System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.*
- 2 Control Joints**—Gypsum panel surfaces should be isolated with control joints or other means where necessary (see SA-923 *Drywall/Steel Framed Systems* for complete details).
SHEETROCK Zinc Control Joints, when properly insulated and backed by gypsum panels, have been fire-endurance tested and are certified for use in one- and two-hour fire rated walls.
- 3 Penetrations**—Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 48" wide require supplemental support for the shaft wall at the opening. Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.
- 4 Pressure Loads**—Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 15 psf are expected, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Shaft walls may be used for air handling with sustained pressures up to 10 psf. Sealant selection including joint treatment, surface coatings and details to seal the wall under these sustained pressures must be provided by the designer. When air pressure exceeds 10 psf, the air handling should be contained with a metal duct.
- 5 Screws**—Type S screws are suitable for gypsum panel attachment to 25, 22 and 20-ga. steel studs. Type S-12 screws

should be specified for other applications to steel heavier than 20-ga. Screw lengths should be at least 3/8" longer than the total thickness of the applied gypsum layers.

- 6 Metal Door and Borrowed-Light Frames**—Frames should be at least 18-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 16-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in a jamb. Stud reinforcing described below is screw-attached to jamb anchors. Three-piece frames may also be used with these partitions provided end of partition floor runner is anchored with two suitable fasteners.

For standard doors up to 3'0" wide weighing not more than 100 lb., ST25 steel studs and runners may be used for framing the opening. For doors 2'8" to 4'0" wide (200 lb. max.) rough framing should be ST20 studs and runners. For heavy doors up to 4'0" wide (300 lb. max.), two ST20 studs should be used. For doors over 4'0" wide, double doors and extra-heavy doors (over 300 lb.), framing should be specially designed to meet load conditions. Rough framing for all doors in fire-rated partitions should be ST20 studs and runners.

For added door frame restraint, spot-grouting at the jamb anchor is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound just before inserting board into frame; do not terminate gypsum panel against trim return.

- 7 Pipe and Conduit Chases**—Additional chases can be provided in steel studs by cutting round holes up to 3/4 of stud width, spaced 12" apart.
- 8 Fixture Attachment**—Lightweight fixtures should be installed with toggle bolts or hollow wall anchors inserted in the panel and preferably, also through the stud. Wood or metal mounting strips for cabinets and shelving should be bolted to the stud framing.
- 9 Height**—Where cavity shaft wall height exceeds maximum available panel height, liner panel end joints should be positioned within the upper and lower third-points of wall. Joints may be butted together or reinforced with horizontal C-H studs or USG H-spline cut to fit between adjacent vertical studs. Walls over 16' high should have studs screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.

Refer to SA-923 *Drywall/Steel Framed Systems* and SA-926 *USG Cavity Shaft Wall Systems* for limiting heights. Values for single- and double-layer systems still apply though they were not calculated for systems using 3/4" ULTRACODE Panels.

- 10 Electrical Boxes**—Cavity shaft walls will accommodate outlet boxes with depths up to the stud width less 1".
- 11 Wood Base**—Apply with trim head screws placed at each stud and midway between studs (12" o.c.).
- 12 Sound Performance**—Seal around all cutouts for lights, cabinets, pipes and plumbing, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided.
- 13 Additional Information**—For additional information and product limitations, see technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels and Accessories Folder SA-927* for information on system components; *USG Cavity Shaft Wall Systems SA-926* for shaft wall information; *Texture and Finish Products Folder SA-933* for finishing product specifications. See *UN-30 Unimast Steel Framing Systems: Technical Information* for data on steel products.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed instructions.

All studs, runners and other accessories identified as UNIMAST products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70° F (13° to 21° C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

A Interior Steel Studs and Runners

UNIMAST Steel Studs—212ST25 (2½"), 312ST25 (3½"), 358ST25 (3¾"), 400ST25 (4"), 600ST25 (6"), 212ST20 (2½"), 312ST20 (3½"), 358ST20 (3¾"), 400ST20 (4"), 600ST20 (6").

UNIMAST Steel Runners—212CR25 (2½"), 312CR25 (3½"), 358CR25 (3¾"), 400CR25 (4"), 600CR25 (6"), 212CR20 (2½"), 312CR20 (3½"), 358CR20 (3¾"), 400CR20 (4"), 600CR20 (6").

USG Steel C-H Studs, (400CH25) (400CH20) hot-dipped galvanized, lengths as required (select from tables in SA-926).

USG Steel E-Studs, (400ES25) (400ES20) (600ES25) (600ES20) hot-dipped galvanized, lengths as required (select from tables in SA-926).

USG Steel J-Runners, (400JR24) (600JR24) (400JR20) (600JR20) hot-dipped galvanized, for USG Steel C-H and E-Studs.

Steel Jamb Struts, (400JS20) (600JS20) hot-dipped galvanized (for elevator door framing).

B Runner Fasteners

Power-driven type, to withstand 193 lb. single shear and 200 lb. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (obtain locally).

C Screws

Size: (¾") (½") (1¼") (2¼") (3")

Style: (framing—Type S or S-12)(drywall—Type S)(self-drilling—Type S-12)

Head: (bugle)(pan)(trim)(pancake)(low-profile)(mod. truss head)

Coating: (reg)(corrosion-resistant).

D Insulation

THERMAFIBER Sound Attenuation Fire Blankets—(2")(3") thick, x24"x48".

E Gypsum Panels

Liner Panels—1" thick SHEETROCK brand Gypsum Liner panels, beveled edge, nominal 24" wide, length as required.

Gypsum Face Panels—¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, 48" wide, 8', 9', 10' and 12' lengths (nonstandard lengths available with minimum quantities).

F Caulking—SHEETROCK Acoustical Sealant.

G Accessory Products

Joint treatment—(select a United States Gypsum Company joint system); refer to SA-919 or SA-927.

SHEETROCK Corner Bead; DUR-A-BEAD 103.

SHEETROCK Zinc Control Joint 093.

SHEETROCK Metal Trim (200-B)(801-B).

Part 3: Execution

3.1 Partition Installation

3.1.1 Stud System Erection

Install steel studs and runners in accordance with SA-923 *Drywall/Steel Framed Systems*.

3.1.2 Cavity Shaft Wall Erection

Install steel studs and liner panels in accordance with SA-926 *USG Cavity Shaft Wall Systems*.

3.1.3 Sound Attenuation Fire Blanket Installation

Install THERMAFIBER Sound Attenuation Fire Blankets after one layer of gypsum panels are applied and before panels are applied to other side of studs. Insert the 24" wide blanket in the stud cavity. Butt ends of blankets closely together and fill all voids.

3.1.4 Gypsum Panel Installation

A Fire Rated 2 Hour Assembly: Steel Studs UL Design U491—

Install steel stud framing system as described in Section 3.1.1 using minimum 3½" studs and friction fit 3" THERMAFIBER SAFB as described in Section 3.1.3. Apply ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels to studs using 1¼" long (Type S) (Type S-12) drywall screws spaced 8" o.c. along panel edges and ends and 12" o.c. along intermediate framing. Stagger board joints 24" on opposite sides of the partition.

B Fire Rated 4 Hour Assembly: Steel Studs UL Design U490—

Install steel stud framing system as described in Section 3.1.1 using minimum 212ST25 studs and friction fit 2" THERMAFIBER SAFB as described in Section 3.1.3. Apply base layer of ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel framing. Attach panels to studs using 1¼" long (Type S) (Type S-12) drywall screws spaced 24" o.c. along all framing. Stagger board joints 24" on opposite sides of the partition. Apply face layer of ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, horizontally with wrapped edges perpendicular to steel framing. Stagger panel end joints 24" from base layer panel joints. Attach panels to steel framing using 2¼" long (Type S) (Type S-12) screws 12" o.c. along all framing. Offset face layer screws from base layer screws by 1". Secure face panel to base panel along the horizontal joints of the face layer with 1½" long Type G screws located midway between steel framing (24" o.c.) and 1" from horizontal joint. Stagger face panel joints by 24" on opposite side of the partition. Alternatively, face panels may be installed vertically with wrapped edges parallel to and fully supported by framing. Attach face panels to steel framing using 2¼" (Type S) Type S-12 screws spaced 12" o.c. Stagger joints in face and base layer by 24" o.c.

C Fire Rated 2 Hour Assembly: USG C-H Studs, UL Design U492—

Install framing system and SHEETROCK brand Gypsum Liner Panels as described in Section 3.1.2 using minimum 400CH25 studs and related accessories. Friction fit min. 3" THERMAFIBER SAFB in stud cavity as described in Section 3.1.3. Apply ¾" thick SHEETROCK brand Gypsum Panels, ULTRACODE Core, vertically with wrapped edges parallel to and fully supported by steel

framing. Attach panels using 1½" long (Type S) (Type S-12) drywall screws spaced 8" o.c. along panel edges and ends and 12" o.c. along intermediate framing.

3.2 Accessory Application

- A** Gypsum Panel Joints—Finish all face layer joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- B** SHEETROCK Acoustical Sealant—Apply a ¼" minimum round bead of sealant to runner track on both sides of partition and at intersections of dissimilar materials. Immediately install gypsum panels and attach in the specified manner to form a tight seal between gypsum panels and adjoining surfaces. Apply sealant behind control joints, at partition intersections. around door frames and openings for ducts, etc. Fully coat the back of electrical boxes.
- C** Corner Bead—Reinforce all vertical and horizontal exterior corners with #103 DUR-A-BEAD corner bead fastened with clinch-on tool or staples 9" o.c. on both flanges along entire length of bead.
- D** Metal Trim—Where partition terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 9" o.c.
- E** Screws—Power-drive at least ¾" from edges or ends of gypsum panels to provide uniform dimple ½" deep. In gypsum base, set flush with surface without tearing face paper.
- F** Control Joints—Break panels behind joint. Apply acoustical sealant to fill gap and attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

Arizona:	Phoenix, (602) 866-0795
California:	Fremont, (415) 792-4400 Glendale, (818) 956-1882
Florida:	Jacksonville, (904) 764-3293 Miami, (305) 557-4501
Georgia:	Atlanta, (404) 393-0770
Hawaii:	Honolulu, (808) 538-7712
Illinois:	Chicago, (312) 606-5845
Indiana:	Indianapolis, (317) 848-1513
Louisiana:	New Orleans, (504) 241-2020
Maryland:	Baltimore, (301) 355-2200
Massachusetts:	Charlestown, (617) 241-8530
Michigan:	Southfield, (313) 569-1900
Minnesota:	Bloomington, (612) 854-4233
Missouri:	St. Louis, (314) 349-0980
New York:	Albany, (518) 458-7437 Oakfield, (716) 948-5287 Stony Point, (914) 786-2820
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Utah:	
Virginia:	
International Division:	Chicago, (312) 606-5840

Technical Services: Contact the following offices for technical assistance concerning design, materials, systems, detailing and specifications.

Eastern Region:	Atlanta, GA (404) 393-0770 Tarrytown, NY (914) 332-8000
Western Region:	Chicago, IL (312) 606-5788 Glendale, CA (818) 956-1882

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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United States Gypsum Company
101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

Drywall/Wood Framed Systems



For lightweight, quickly erected, fire-rated walls
and ceilings with excellent sound attenuation

USG

The basic gypsum drywall assemblies described herein offer economical, quickly erected, load-bearing partitions, walls and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation Walls fire-rated gypsum drywall assemblies for multi-family housing (see separate System Folder SA-925) and TEXTONE Vinyl-Covered Gypsum Panels (see separate Product Folder SA-928). Variations of the systems meeting special requirements are outlined below:

Single layer—a basic drywall load-bearing construction suitable where SHEETROCK brand Gypsum Panels are applied direct to wood framing—either vertically with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Perpendicular application, recommended except in certain fire-rated partition construction, provides greater strength, reduces joint treatment and blocking needed, and compensates for uneven framing alignment. Fastening of panels is by four alternate methods:

- 1 **Standard single nailing**—6" to 7" o.c. spacing for ceilings, 7" to 8" for walls.
- 2 **Double nailing**—for minimizing defects due to loosely nailed panels. First nails spaced 12" o.c., followed by second nails in close proximity (2") of first.
- 3 **Screw application**—best known insurance against fastener pops caused by loosely attached panels. 1 1/4" Type W screw is used.
- 4 **Adhesive application**—continuous bead of drywall stud adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When vinyl foam tape is used on sidewalls with stud adhesive, supplementary fasteners are unnecessary.

Three proven methods of upgrading single layer job quality:

- 1 **SHEETROCK brand Gypsum Panels, SW Edge**—Panels have an exclusive tapered rounded edge to help minimize ridging or beading and other imperfections and help compensate for extremes of temperature and humidity during construction.
- 2 **Back-Blocking Joint Reinforcement**—a method designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions.
- 3 **Floating Interior Angle System**—application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.

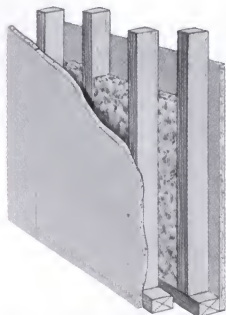
Double Layer—systems have a face layer of SHEETROCK brand Gypsum Panels job-laminated to a base layer of gypsum panels and/or nailed or screw-attached through base layer directly to wood



framing in walls and ceilings. Because laminated systems minimize the use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: (a) strip lamination—SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed applied in vertical strips 24" o.c. and supplementary 1 1/2" Type G screws, or (b) sheet lamination—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries.

When a fire rating is not required, contact bonding of face layer with adhesive is preferred. Either laminating adhesive (notched-spreader applied) or liquid contact adhesive (roller-applied) is used with fasteners 16" o.c. at top and bottom of wall panels and perimeter fasteners 24" o.c. on ceilings.

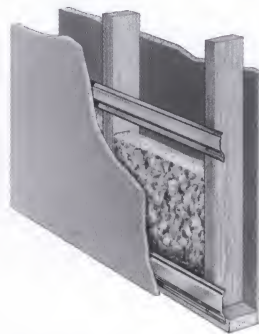
These assemblies are completed with a United States Gypsum Company joint treatment system and decorating. In walls, however, when predecorated TEXTONE Vinyl-Faced Gypsum Panels are adhesively applied, joint treatment is not required (see folder SA-928).



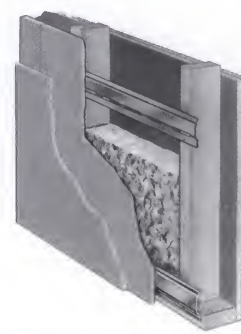
Single-layer staggered stud partition (sys. ref. E)



Double-layer partition (sys. ref. J)



Single-layer resilient partition (sys. ref. B)

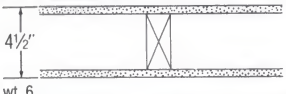
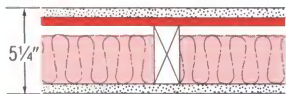

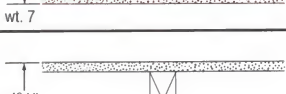
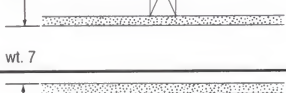
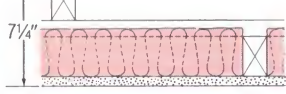
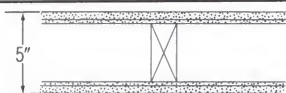




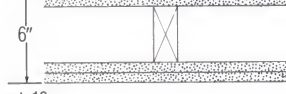


Double-layer resilient partition (sys. ref. H)

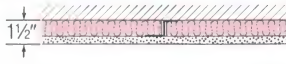
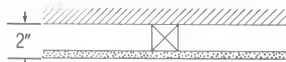
Partition Applications

Insulation.

RC-1™ Resilient Channels.

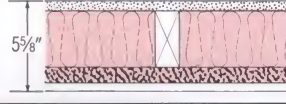

Fire rating	Fire-rated construction detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
45 min.	 wt. 6	Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—panels nailed 7" o.c.— $\frac{1}{2}$ " cem ctd nails—joints exp or fin— UL Des U317	N/A		A
1 hr.	 wt. 7	Wd Stud—resil partition— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" or 24" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with $\frac{1}{2}$ " Type W screws—end joints back-blocked with RC-1 chan—joints fin—perimeter caulked— UL Des U311	50	BBN-760903	B
1 hr.	 wt. 7	Wd Stud—resil partition— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core—2x4 16" o.c.—RC-1 chan both sides spaced horiz 24" o.c.—panels att with 1" Type S screws—joints fin—perimeter caulked— T-1396-0SU	41	Based on RC-1 channel one side only— USG-860802	C
1 hr.	 wt. 7	Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core—2x4 16" or 24" o.c.—panels nailed 7" o.c.— $\frac{1}{2}$ " cem ctd nails—joints exp or fin—perim caulked— UL Des U305 based on 16" stud spacing— UL Des U314 based on 24" stud spacing, joints fin	34 37 46	Based on 16" stud spacing and screws 6" o.c.— USG-30-FT-G&H Based on 24" stud spacing— USG-860807 Based on 24" stud spacing & 3" SAFB— BBN-700725	D
1 hr. est	 wt. 8	Stag Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core—2x3 non-load bearing studs 16" o.c.—2x3 plates 1" apart—panels nailed 7" o.c.—3" THERMAFIBER SAFB one side—joints fin—perim caulked—est. fire rating based on UL Des U305	54	Based on SHEETROCK brand gypsum panels, FIRECODE C core, and on screws or nails 7" o.c.— TL-77-149	E
1 hr. est	 wt. 8	Wd Stud—2 layer—base layer $\frac{1}{2}$ " SHEETROCK brand gypsum panels appl vert with 4d ctd nails— $\frac{1}{2}$ " panel face layer strip lamin— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c.—joints stag & fin—perimeter caulked—est. fire rating based on UL Des U305	45 53	TL-69-52 Based on $\frac{1}{2}$ " lamin. FIRECODE core face layers & $\frac{1}{2}$ " SAFB— USG-221-ST-G&H	F
1 hr. est	 wt. 8	Stag Wd Stud— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails 7" o.c.—2" THERMAFIBER SAFB one side—perim caulked—joints fin—est. fire rating based on UL Des U305	45	Based on FIRECODE core panels— TL-69-213	G
1 hr. est	 wt. 12	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side—2x4 16" o.c.—3" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—end joints back-blocked with RC-1 chan—joints fin— UL Des U334	59 49	TL-67-239 Based on same construction without SAFB— TL-67-212	H
2 hr.	 wt. 13	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, ea side—2x4 16" o.c.—2" THERMAFIBER SAFB—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—resil layers perim caulked—joints fin— T-4799-0SU	58 52	USG-810219 Based on same assembly (non-rated) without SAFB— USG-810218	I
2 hr.	 wt. 12	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE core, or SHEETROCK brand gypsum panels, water-resistant, FIRECODE core, ea side—2x4 16" o.c.—base layer att with $\frac{1}{2}$ " nails 6" o.c.—face layer att with $\frac{1}{2}$ " nails 8" o.c.—joints exp or fin— UL Des U301	NA		J
2 hr. est	 wt. 13	Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2 rows 2x4 16" o.c. on sep plates 1" apart—base layer att with 6d ctd nails 16" o.c.—face layer att with 7d ctd nails 7" o.c.—perim caulked—joints fin—est. fire rating based on UL Des U301	51 56	TL-69-214 Based on $\frac{3}{4}$ " thick insulation in one cavity— USG-710120	K
2 hr. est	 wt. 13	Stag Wd Stud—2 layers $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—2x4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin—est. fire rating based on UL Des U301	47	TL-69-211	L

Wall Furring Applications

Detail & physical data	Description	Comments
	SHEETROCK Z-Furring Channels 24" o.c.—THERMAFIBER fire safety FS-15 blankets between channels—1/2" SHEETROCK brand gypsum panels, foil-back, screw-attached—joints finished	System suitable for up to 3" thick insulation; good vapor retarder, no limiting height M
	Wood furring strips 16" o.c.—1/2" SHEETROCK brand gypsum panels, foil-back—joints finished	Surface not isolated from structural stresses N

For ceiling applications, see page 8.

Exterior Wall Applications

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Comments
1 hr.		Wd Stud—3/4" SHEETROCK brand gypsum panels, FIRECODE C core, interior—1" extruded polystyrene insul sheathing and 1/2" plywd siding—2x4 16" o.c.—3/4" THERMAFIBER fire safety FS-15 blankets—sheathing appl horiz with 1 1/2" galv nails 12" o.c.—gypsum panels appl vert with 6d cem ctd nails 7" o.c.—joints fin—CEG 12-5-79	Rating applicable to fire exposure on interior face only. O
2 hr.		Wd Stud—2 layers 3/4" SHEETROCK brand gypsum panels, FIRECODE core, interior—1/2" gypsum sheathing and 4" brick masonry veneer exterior—2x4 16" o.c.—sheathing appl horiz with 1 1/2" galv nails 6" o.c.—gypsum panels appl horiz or vert with nails 8" o.c.—joints stag & fin—UL Des U302†	P

†Fire rating also applies with IMPERIAL FIRECODE C Base and veneer finish interior surface.

Sound Transmission Loss—db

System reference (p.3)	Test no.	Method	Band center frequency—Hz																STC
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
H	TL-67-239	Lab	35	41	47	53	56	57	59	60	61	63	64	65	65	64	59	61	59
I	USG-810219	Lab	39	42	48	51	53	56	57	57	60	60	60	62	57	58	59	61	58
K	USG-710120	Field	43	40	46	49	48	49	51	54	56	59	60	64	66	66	65	71	56
E	TL-77-149	Lab	31	38	39	45	50	52	55	57	57	57	59	58	57	55	55	57	54
F	USG-221-ST-G&H	Lab	30	37	42	47	48	48	48	51	55	57	58	59	59	57	59	62	53
I	USG-810218	Lab	38	31	38	45	49	53	52	54	56	57	58	59	53	55	58	62	52
K	TL-69-214	Lab	31	35	34	39	44	48	51	53	56	56	59	57	50	53	59	59	51
B	BBN-760903	Lab	26	30	36	42	45	47	50	55	56	57	57	57	55	51	54	58	50
H	TL-67-212	Lab	26	30	33	39	42	47	49	52	55	57	60	61	61	58	53	56	49
L	TL-69-211	Lab	30	33	35	40	40	42	44	46	49	51	52	52	48	48	53	57	47
F	TL-69-52	Lab	21	28	34	35	39	41	41	46	49	51	54	56	55	53	52	55	45
G	TL-69-213	Lab	25	31	35	37	41	40	40	43	46	46	51	51	47	47	51	54	45
D	USG-860807	Lab	25	20	34	37	33	32	37	36	40	42	44	45	38	34	36	41	37

Resilient Attachment—SHEETROCK brand Gypsum Panels are screw-attached to RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) which are screw-attached 24" o.c. to the framing. The galvanized steel channels "float" the panels away from the framing; provide a spring action that isolates the gypsum panel surface. These systems combine highly effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer 3/4" SHEETROCK brand Gypsum Panels, FIRECODE C Core, resiliently attached to one side of studs and directly attached to the other side, plus 3" THERMAFIBER SAFB pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 50, at costs which are little more than for conventional partition systems. (Use of a filler strip at the base may reduce STC rating.) It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments.

Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with THERMAFIBER SAFB and RC-1 Resilient Channels applied to one side of wood studs (see table above).

Area Separation Walls—fast-erecting non-load bearing drywall partitions for low-cost fire barriers in wood-frame multi-family housing (see separate Systems Folder SA-925).

Wall Furring—SHEETROCK brand Gypsum Panels, Foil-Back, provide an economical, efficient vapor retarder and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16" o.c. or screw-attached to SHEETROCK Z-Furring Channels 24" o.c. The channels mechanically attach THERMAFIBER Fire Safety FS-15 Blankets or rigid foam insulation to the interior of exterior walls. The system provides a self-furring solid backup for SHEETROCK brand Gypsum Panels, Foil-Back, screw-attached to the channels.

Renovation—1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to SHEETROCK Z-Furring Channels with THERMAFIBER SAFB between channels, improve the sound control of wood stud plaster walls. With 3" channels and 2" blankets, the assembly provides 50 STC sound rating.

Gypsum panels for these assemblies are available in five thicknesses and nine types. SHEETROCK brand Gypsum Panels, FIRECODE Core, and SHEETROCK brand Gypsum Panels, FIRECODE C Core, obtain higher fire-resistance ratings than regular panels.

SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a tile base for tub and shower areas. SHEETROCK brand Exterior Gypsum Ceiling Board offers superior weather-and-sag-resistance plus excellent paintability in exterior soffits.

Gypsum panels are easily screw-applied to channel-type corrosion-resistant steel studs. See *SA-923 Drywall/Steel Framed Systems* in this series for details.

Limitations

- 1 SUPER-TITE or BUILDEX Type S Screws must be used for attachment of single-layer panels to RC-1 Resilient Channels.
- 2 Resilient channels must be attached with 1½" SUPER-TITE or BUILDEX Type W or Type S Screws. Nails must not be used.
- 3 Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" shown in Gypsum Panels Product Folder SA-927.
- 4 Direct attachment to wood framing with fastener penetration into wood exceeding 1" is not recommended except where required to meet fire rating.
- 5 Maximum resilient channel spacing: ceilings—24" o.c. for joists 16" o.c.; 16" o.c. for joists 24" o.c. Sidewalls—24" o.c. Also see support spacing limitations on right.
- 6 SHEETROCK brand Gypsum Panels should not be exposed to excessive or continuous moisture and extreme temperature. Specially formulated SHEETROCK brand Gypsum Panels, Water-Resistant, are recommended as a base for wall tile in bathrooms and other high moisture areas, but they are not recommended for areas subject to constant moisture such as gang showers and commercial food processing. DUROCK Interior Cement Board is recommended as a ceramic tile base under these conditions.

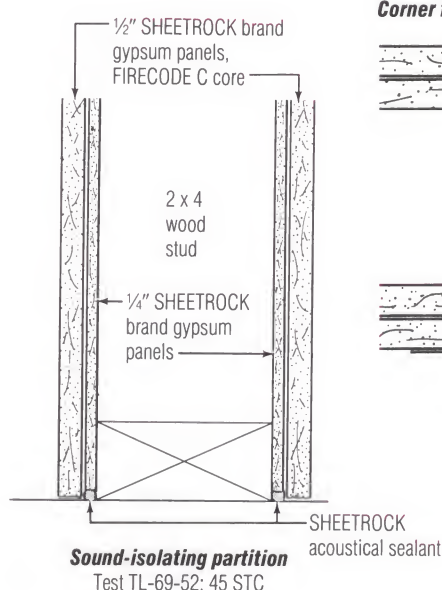
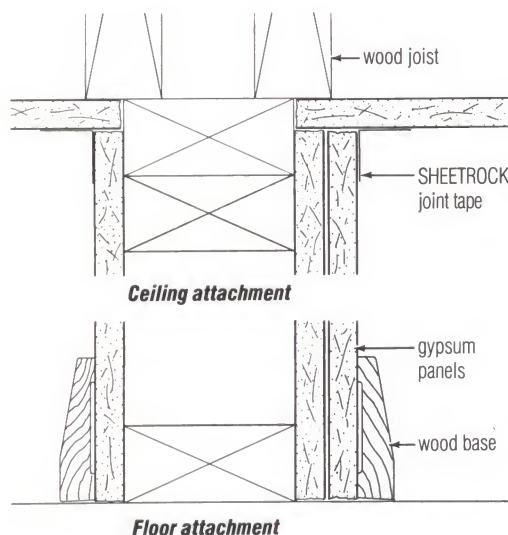
- 7 Maximum support (studs, joists, channels, furring) spacing for gypsum panels:

Panel thickness ⁽¹⁾	Location	Application method ⁽²⁾	Max. support spacing o.c.	
Single-Layer Application			in	mm
⅝" (9.5 mm)	ceilings ⁽³⁾	perpendicular ⁽⁴⁾	16	406
	sidewalls	parallel or perpendicular	16	406
⅞" (12.7 mm)	ceilings	parallel ⁽⁴⁾	16	406
		perpendicular	24 ⁽⁵⁾⁽⁶⁾	610
	sidewalls	parallel or perpendicular	24	610
⅞" (15.9 mm)	ceilings ⁽⁶⁾	parallel ⁽⁴⁾	16	406
		perpendicular	24	610
	sidewalls	parallel or perpendicular	24	610
Double-Layer Application				
⅝" (9.5 mm)	ceilings ⁽⁷⁾	perpendicular	16	406
	sidewalls	perpendicular or parallel	24 ⁽⁸⁾	610
⅞" & ⅝" (12.7 & 15.9 mm)	ceilings	perpendicular or parallel	24 ⁽⁸⁾	610
	sidewalls	perpendicular	24 ⁽⁸⁾	610

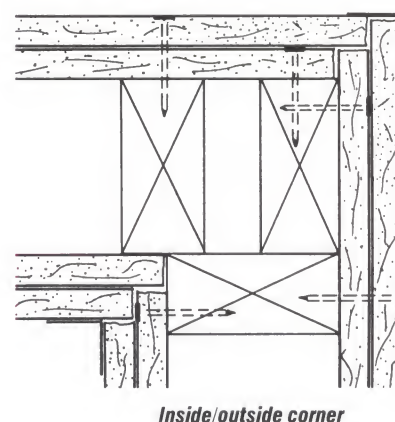
(1) A ⅝" thickness is recommended for the finest single-layer construction, providing increased resistance to fire and transmission of sound; ⅞" for single-layer application in new residential construction and remodeling; and ⅞" for repair and remodeling over existing surfaces. (2) Long edge position relative to framing. (3) Not recommended below unheated spaces. (4) Not recommended if water-based texturing material is to be applied. (5) Max. spacing 16" if water-based texturing material is to be applied. (6) If ⅞" SHEETROCK brand Interior Gypsum Ceiling Board is used, max. spacing is 24" o.c. for perpendicular application with weight of unsupported insulation not exceeding 1.3 psf., when water-based texturing materials are used. (7) Adhesive must be used to laminate ⅞" board for double-layer ceilings. (8) Max. spacing 16" o.c. if fire rating required.

- 8 These assemblies are not recommended for exterior soffits and ceilings which project upwards and away from the building proper.

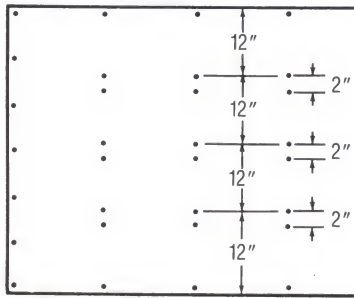
Details/Partitions



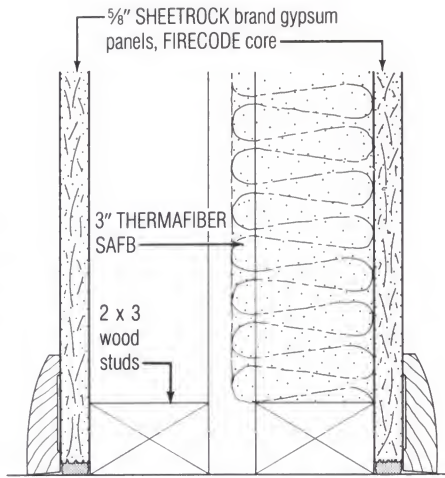
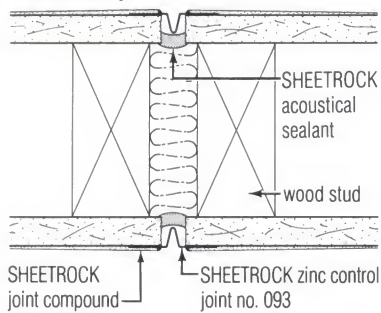
Corner framing details



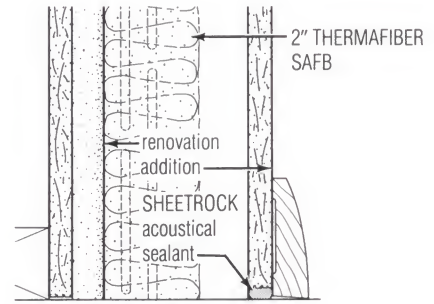
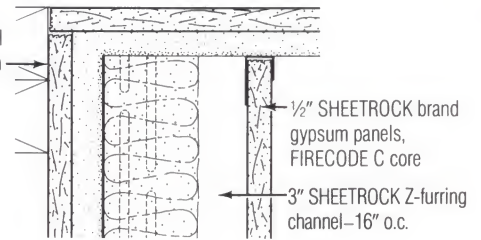
Double nailing application



Wall control joint

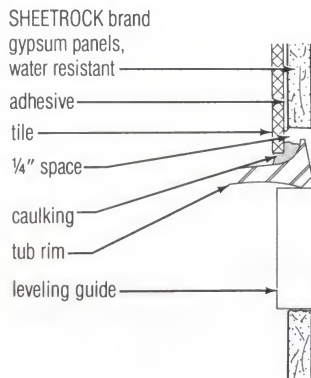


Sound-isolating chase wall partition
Test TL-77-149: 54 STC

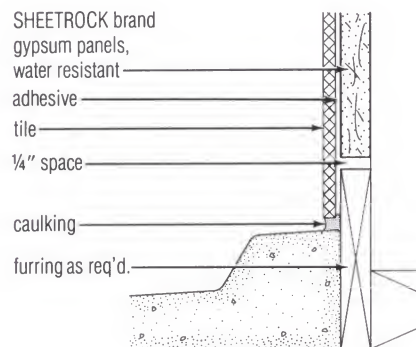


Partition renovation
Test USG-811101:50 STC

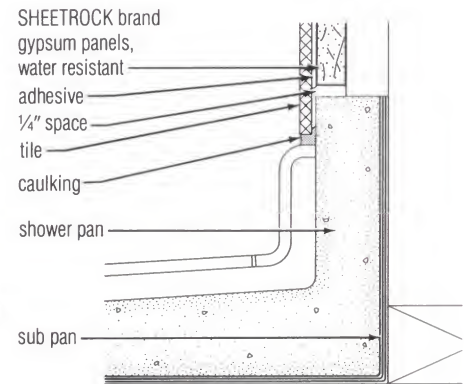
Tub and shower details—SHEETROCK brand gypsum panels, water resistant single-layer panels



Tub

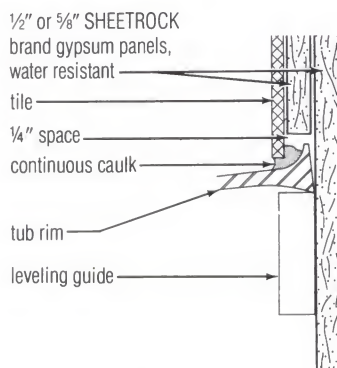


Shower receptor

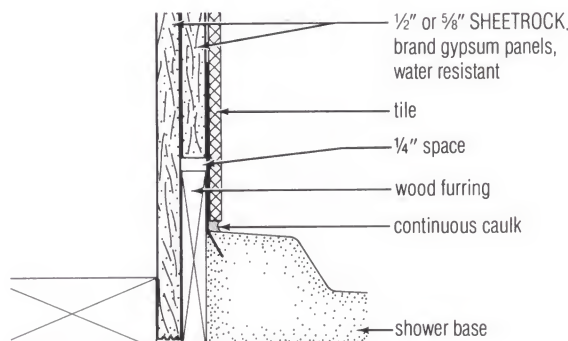


Shower pan

Double-layer panels

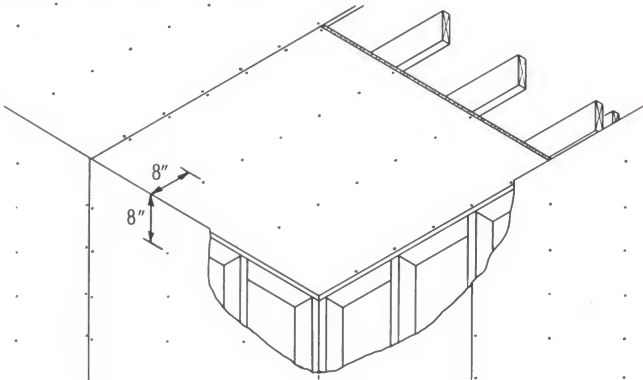


Tub

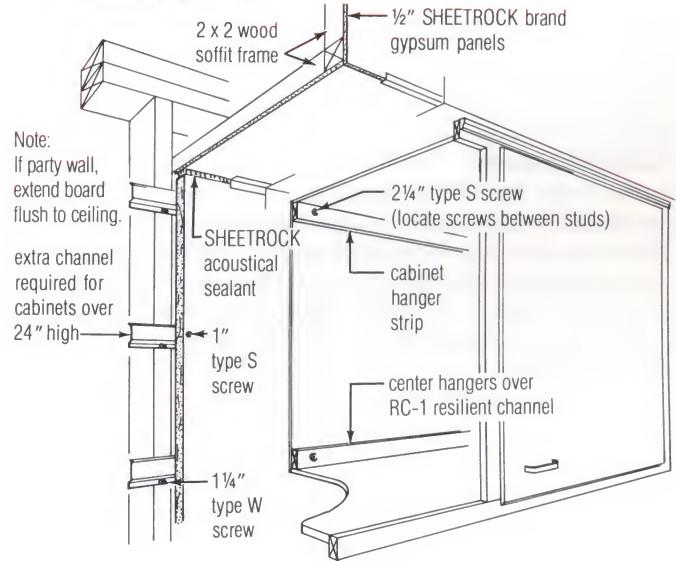


Shower receptor

Floating interior angle system



Cabinet attachment

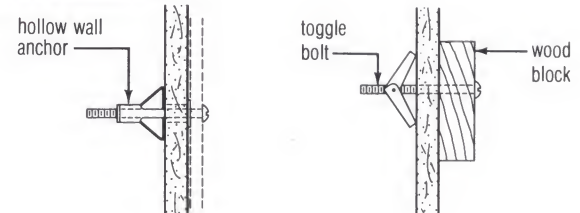


Fastener load data

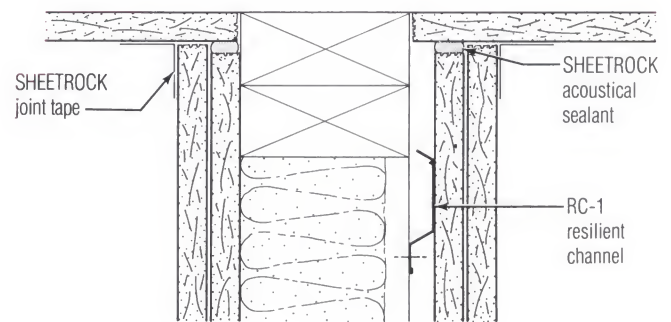
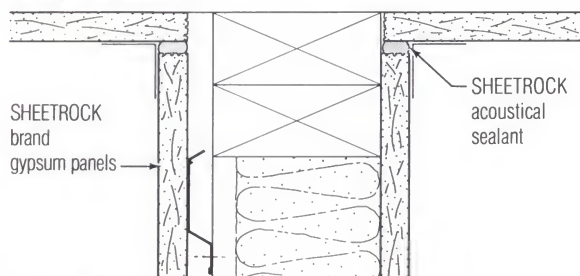
Fastener type	Size		Base assembly	Allow. withdrawal resistance		Allow. shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
hollow wall anchor or toggle bolt	3/8	3.18	1/2" gypsum panel	20	89	40	178
	1/2	4.76		30	133	50	222
	5/8	6.35		40	178	60	267

(1) Newtons

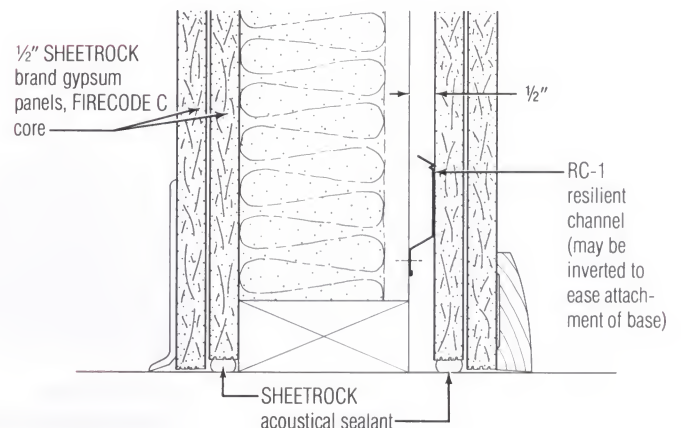
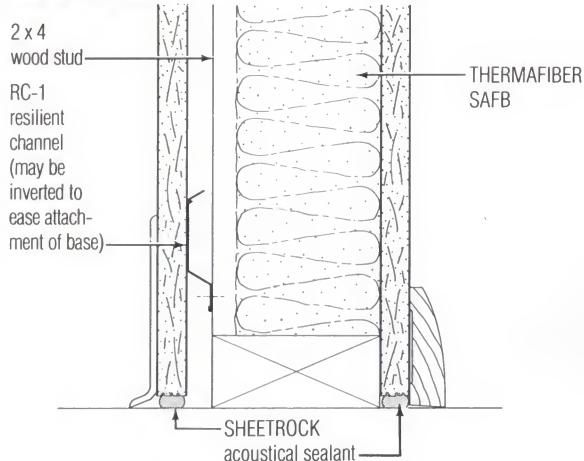
Fixture attachments—light



Ceiling attachments



Floor attachments



Single layer—In single-layer ceiling assemblies, SHEETROCK brand Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6" to 7" o.c. (6" for fire-rated construction); 1¼" Type W screws are spaced 12" o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing.

Resilient attachment—Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with Type S screws. A 1-hour fire rating is available with ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

High performance—USG High Performance Floor/Ceiling Systems achieve a 2-hour fire resistance rating (UL Design L541) and deliver STC/MTC ratings as high as 60/54, IIC ratings as high as 62. Floors consist of 1" SHEETROCK brand Gypsum Liner Panels over ½" plywood and are finished in one of two ways: (1) ceramic tile over ½" DUROCK Exterior Cement Board, or, (2) vinyl tile or carpet/pad over ½" oriented strand board. Ceilings consist of two layers ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, applied over RC-1 Resilient Channels. Installed within the cavity are 3" THERMAFIBER SAFB. See data sheet WB-1868 for complete information.

Direct suspension—When additional ceiling space is needed to accommodate large ducts or pipes, gypsum panels are screw-attached below a direct suspension system. This direct-hung steel ceiling grid consists of main beam runners 4' o.c. and cross furring channels spaced 24" o.c. A cross beam supports the edge of lighting fixtures. With ½" or ¾" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to this grid, a one-hour fire-rated wood joist floor/ceiling is provided. The assembly includes provision for lighting fixtures, air ducts and dampers.

Textured ceilings—When water-based texturing materials will be applied, ½" SHEETROCK brand Interior Gypsum Ceiling Board is ideal because it supports both the sprayed texture and insulation like ¾" thick panels but at less cost.

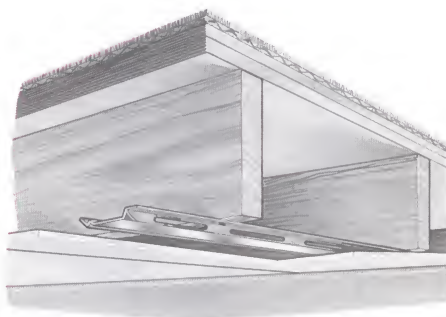
Renovation—To improve the sound control of wood framed floor-ceilings, ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, are screw-attached to 2" SHEETROCK Z-Furring Channels fastened to bottom of joists. With 2" THERMAFIBER SAFB between channels, the system provides 45 STC and 40 IIC ratings (see detail, page 11).

Exterior Soffits—eaves, canopies, carports and other exterior soffits with indirect exposure to the weather are quickly and economically completed with SHEETROCK brand Exterior Gypsum Ceiling Board fastened directly to joists (see United States Gypsum Company Bulletin WB-1152 for detailed specification). Maximum frame spacing and other limitations for these systems are shown on page 5.

Single-layer ceiling
(sys. ref. A)



Double-layer ceiling
(sys. ref. D)



Resilient channel with blankets
(sys. ref. G)



USG High Performance Floor/Ceiling Systems (sys. ref. P)



**Ceramic Tile over
DUROCK Exterior Cement Board
Floor/Ceiling Assembly**

STC: 60 MTC: 54 IIC: 52



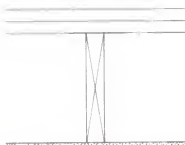
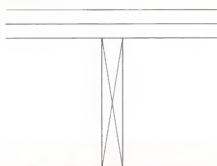
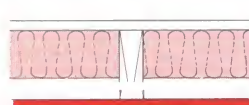
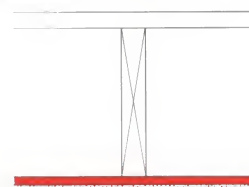
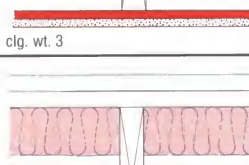
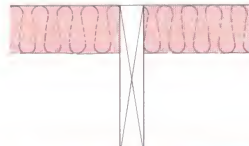
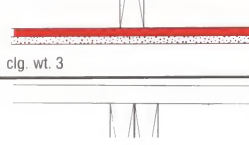
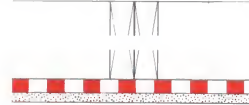
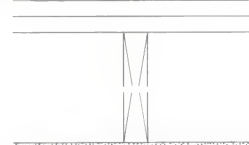


**Vinyl Tile over
Oriented Strand Board
Floor/Ceiling Assembly**

STC: 58 MTC: 53 IIC: 51



**Carpet/Pad over
Oriented Strand Board
Floor/Ceiling Assembly**

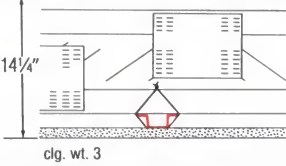
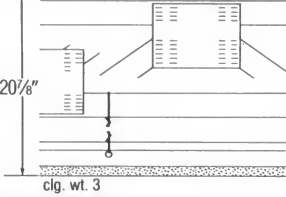
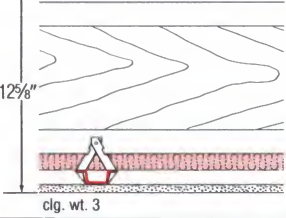
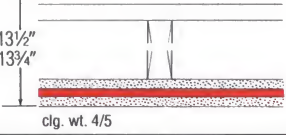
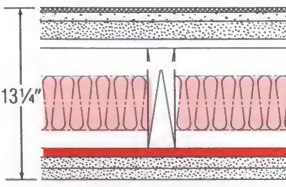
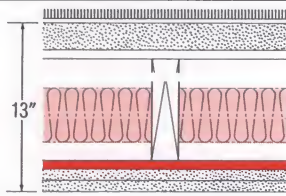
STC: 59 MTC: 54 IIC: 62

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	IIC	Description & test no.	
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin— UL Des L512	N/A			A
	clg. wt. 3					
1 hr.		Resil ceiling—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L514	N/A			B
	clg. wt. 3					
1 hr.		Resil ceiling—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1 1/2" perlite-sand conc over 3/8" plywd sub-floor—2 x 10 wd joist 16" o.c.—3" glass fiber batts betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin— UL Des L516	59		Based on 3/4" gypsum concrete and 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— USG 740704	C
	clg. wt. 3			47	Based on vinyl tile atop flooring— USG 740703	
				65	Based on 44-oz. carpet & 40-oz. pad atop flooring— USG 740705	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	39	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-6	D
			47	39	Based on 5/8" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-10	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	47	67	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-7	E
	clg. wt. 3		48	66	Based on 3/4" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-9	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	51	46	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-9	F
			50	46	Based on 3/4" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-3	
1 hr. est		Resil ceiling—1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE core—1 1/2" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2 x 10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—end joints back-blocked with RC-1 chan—joints fin—est. fire rating based on UL Des L514	52	71	Based on 1/2" SHEETROCK brand gypsum panels, FIRECODE C core— CK-6512-8	G
	clg. wt. 3		51	70	Based on 3/4" SHEETROCK brand gypsum panels, FIRECODE core— CK-6412-4	
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—single 4 x 10 wd joist 48" o.c.—met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin— UL Des L508	N/A			H
	clg. wt. 3					
1 hr.		1/2" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin— UL Des L501	38	32	CK-6412-7	I
	clg. wt. 3		39	56	Based on 44-oz carpet & 40-oz pad atop flooring— CK-6412-8	
1 hr. est		1/2" SHEETROCK brand gypsum panels, FIRECODE core, ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB betw joists—panels att with 6d nails 6" o.c.—joints fin—est. fire rating based on UL Des L501	41	32	CK-6412-6	J
	clg. wt. 3		40	58	Based on 44-oz carpet & 40-oz pad atop flooring— CK-6412-5	
1 hr.		1/2" or 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—susp grid with main run 4" o.c. and cross tees 2" o.c.—panels screw-att below grid—joints fin— UL Des L525	N/A			K
	clg. wt. 3					

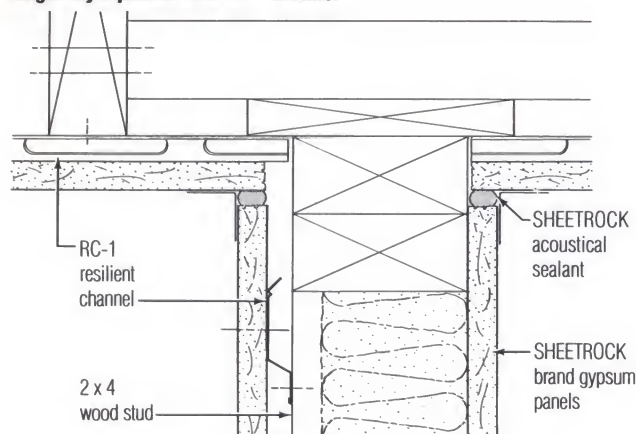
Insulation.

RC-1™ Resilient Channels.

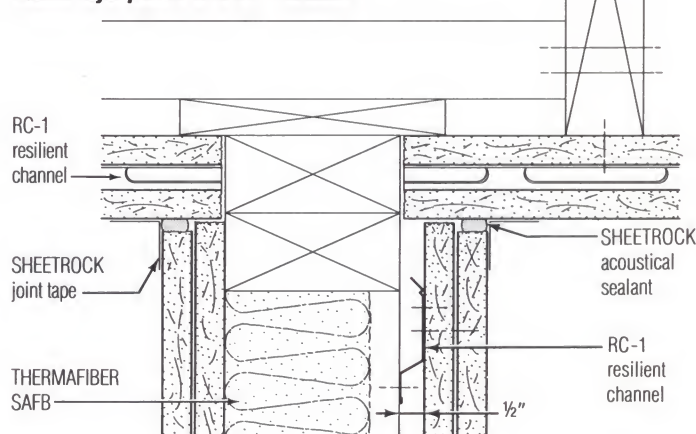
Furring Channels.

Fire rating	Fire-rated construction		Acoustical performance			System reference
	Detail & physical data	Description & test no.	STC	HC	Description & test no.	
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—2x12 wd truss of 2x4 lbr secured with steel truss plates—trusses 24" o.c.—3/4" nom plywd flr—met fur chan 24" o.c. wire-tied to trusses—panels att with 1" Type S screws 12" o.c.—joints fin— UL Des L528	N/A			L
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—2x12 wd truss of 2x4 lbr secured with steel truss plates—trusses 24" o.c.—3/4" nom plywd flr—susp grid with main run 4" o.c. and cross tees 2" o.c.—panels att with 1" Type S-12 screws 12" o.c.—joints fin— UL Des L529	N/A			M
1 hr.		5/8" SHEETROCK brand gypsum panels, FIRECODE C core, ceiling—3/4" T&G plywd flr—10" I-shaped wd joist 24" o.c.—met fur chan 24" o.c. clip-att to joist—1" THERMAFIBER insul laid over chan below joists—panels screw att to chan 12" o.c.—joints fin— UL Des L530 based on Trus Joist members— UL Des L531 based on Timjoist, Inc. Type TMI members	47	40 54 43	TL-81-87—IN-81-16 Based on carpet & pad atop flooring— IN-81-17 Based on cushioned vinyl atop flooring— IN-81-19	N
1 1/2 hr. 2 hr.		Resil ceiling—2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core—1" nom wd sub & fin flr—2 x 10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw-att over base layer panels—face layer screw att to chan 12" o.c.—joints fin— UL Des L510 —2 hr. sys. with 5/8" SHEETROCK brand gypsum panels, FIRECODE C core— UL Des L511	N/A		Assembly not recommended when sound control is a major consideration	O
2 hr.		Floor/ceiling—floor of 8"x8" ceramic tile, 1/2" DUROCK exterior cement board, 1" SHEETROCK brand gypsum liner panels, 5/8" plywood—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	60 58 59	52 51 62	RAL-TL89-141 (54 MTC)— RAL-IN89-5 Based on vinyl tile over oriented strand board in place of ceramic tile and cement board— RAL-TL89-145 (53 MTC)— RAL-IN89-7 Based on carpet/pad over oriented strand board in place of ceramic tile and cement board— RAL-TL89-146 (54 MTC)— RAL-IN89-8	P
2 hr.		Floor/ceiling—floor of carpet/pad, 1 1/2" Type F flooring, 5/8" plywood—2x10 wd joist 16" o.c.—3" THERMAFIBER SAFB—ceiling of 2 layers 5/8" SHEETROCK brand gypsum panels, FIRECODE C core, over RC-1 chan 16" o.c.— UL Des L541	59 59	69 37	RAL-TL90-40 (54 MTC)— RAL-IN90-5 Based on vinyl tile in place of carpet/pad— RAL-TL90-40 (54 MTC)— RAL-IN90-6	Q

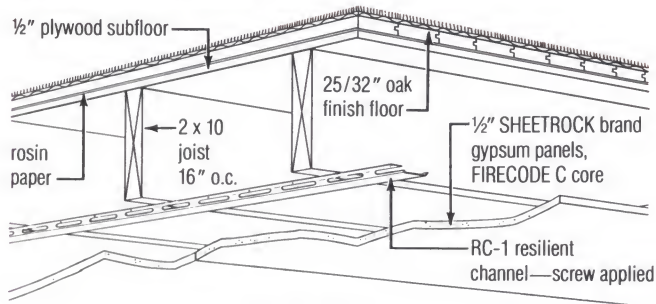
Single-layer panels with RC-1 channel



Double-layer panels with RC-1 channel



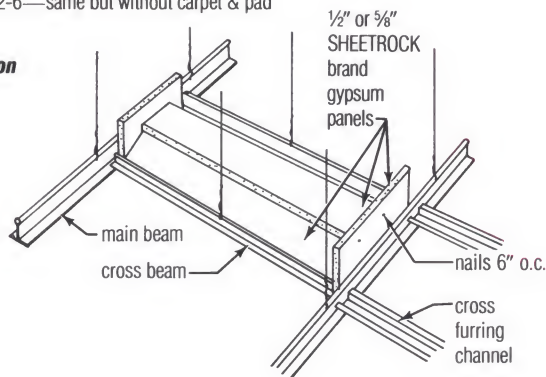
Ceiling and floor assemblies



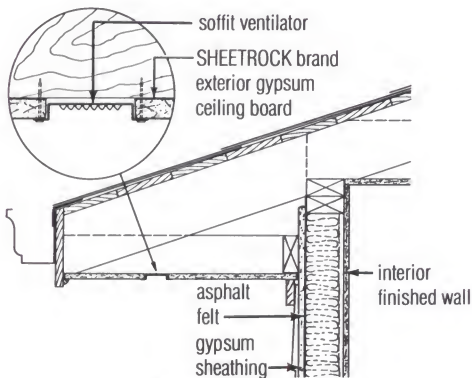
Test CK-6512-7

Test CK-6512-6—same but without carpet & pad

Light fixture fire protection

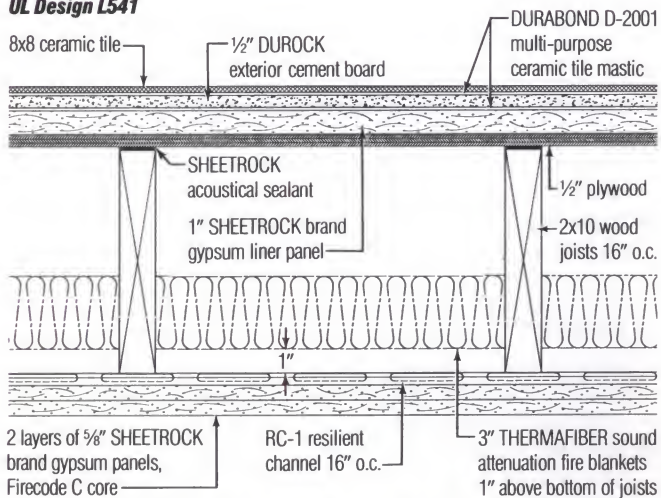


Exterior walls & soffit

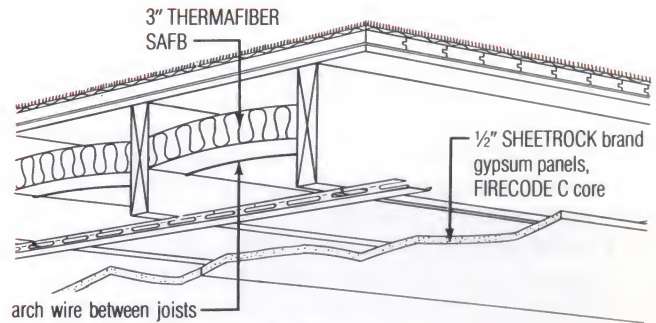


Mineral shingle exterior

UL Design L541

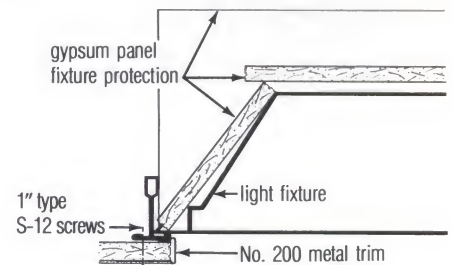


Ceramic tile over DUROCK exterior cement board and SHEETROCK brand gypsum liner panels

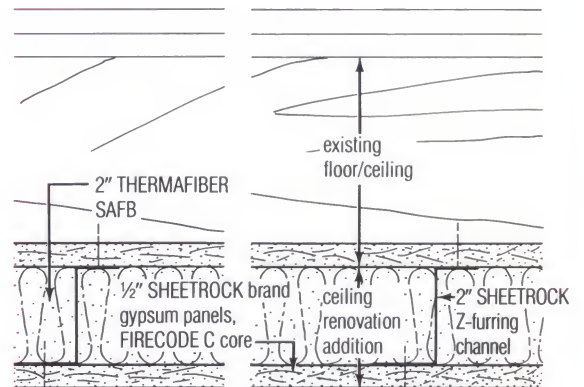


Test CK-6512-8

Test CK-6512-9—same but without carpet & pad



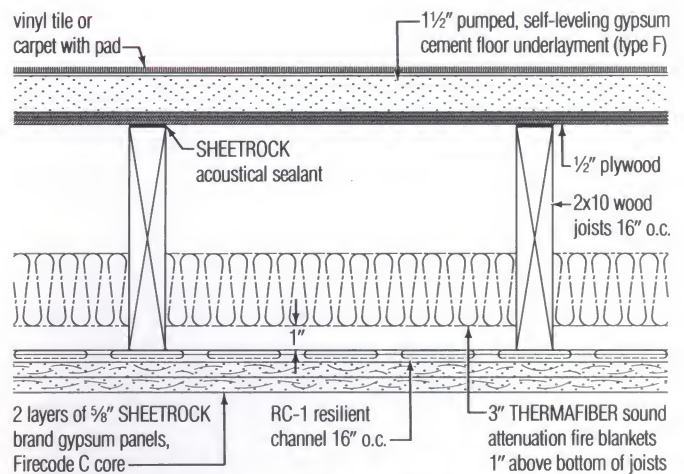
Lighting fixture



Ceiling renovation

Test USG-800107: 45 STC

USG-800108: 40 IIC



Vinyl tile or carpet/pad over type F flooring

1 System Performance—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.

2 Control Joints—Gypsum panel surfaces should be isolated with control joints or other stress relief where: **(a)** partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; **(b)** ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; **(c)** construction changes within the plane of the partition or ceiling; **(d)** partition or furring run exceeds 30'; **(e)** ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief; **(f)** exterior soffits exceed 30' in either direction; **(g)** wings of "L," "U" and "T"-shaped ceiling areas are joined; **(h)** expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints. Less-than-ceiling height frames should have control joints extending to the ceiling from both corners. Treat window openings in same manner as doors.

Gypsum panel surfaces should not be firmly anchored across the flat grain of wide dimensional lumber such as floor joists and headers. Float panels over these members using resilient channels or provide a control joint to counteract wood shrinkage.

3 Penetrations of the gypsum panel diaphragm, such as borrowed lights, access panels, light troffers, require additional reinforcement at corners to distribute concentrated stress if a control joint is not used.

4 Sound tests are conducted under ideal laboratory conditions per ASTM procedures. Comparable field performance depends on building design and careful attention to detailing and workmanship. Where these partitions are used for sound control, seal the partition perimeter with 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Back-to-back penetrations of the diaphragm, flanking paths, door and borrowed-light openings should be avoided. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction.

5 Air, Water and Vapor Control—Flashing and sealants as shown in the construction documents and as selected by the architect and/or structural engineer should be provided to resist air and water infiltration. The flashing and sealants selected shall be installed in a workmanlike manner in appropriate locations to maintain continuity of air/water barriers, particularly at windows, doors and other penetrations of exterior wall. All gypsum sheathing must be covered with No. 15 asphalt felt or TYVEK Housewrap sheet to assure watertight construction. Asphalt felt should be applied horizontally with 2" overlap and attached to sheathing. TYVEK sheets should be stapled to sheathing according to manufacturer's directions. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c.

Vapor retarder is normally installed on the warm side of wall in cold climates to prevent interior moisture from entering the stud cavity. Where high humidity and temperature conditions predominate, the use and location of a vapor retarder should be determined by a qualified mechanical engineer to prevent moisture condensation within the wall. Vinyl wall coverings are not recommended for the interior of walls containing vapor retarders.

6 Ceramic Tile—SHEETROCK brand Gypsum Panels, Water-Resistant, or DUROCK Interior Cement Boards are recommended as a base for adhesive application of ceramic and plastic tile and plastic-faced wall panels. A vapor retarder is not recommended.

Taping and finishing of SHEETROCK brand Gypsum Panels, Water-Resistant, is required under tile. It is recommended that all joints and fastener heads be treated with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. The compound should also be used to embed tape beyond areas to be tiled. These areas should be finished with conventional joint systems.

7 Wood Framing Requirements—Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.

8 Ceilings—To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for 1/2" thick panels with frame spacing 24" o.c.; 2.2 psf for 5/8" panels on 16" o.c. framing and 3/4" panels on 24" o.c. framing. Foil-back panels or a separate vapor retarder should be installed in all roofed ceilings, and the plenum or attic space vented with a min. 1/2-sq. in. net free vent area per sq. ft. of horizontal surface.

Water-based texturing materials applied to ceilings should be completely dry before insulation and vapor retarder are installed. Under most conditions, drying takes several days; i. e., 10% R.H. and 90° F conditions require 1.5 days; 90% R.H. and 90° F require 10.5 days; 30% R.H. and 60° F require 5.3 days.

9 Back-Blocking—Ridging or deformation at the panel joints may occur in gypsum board construction under adverse job or weather conditions. Back blocking end joints will minimize joint ridging and is recommended. Where back-blocking is used, float the end joints between supports and back-block with an 8" wide strip of gypsum board the full length of the joint adhesively applied over abutting ends. For fire-rated resilient construction, back butt-end joints with RC-1 Resilient Channels. Refer to Gypsum Construction Handbook for complete details.

10 Fixture Attachment—Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.

11 Double-Layer Laminated 1/2" Panels—In this assembly, use scaffold nails driven through gypsum blocks into the framing at third points vertically, or temporary shoring. The 1 1/2" Type G screw is not recommended.

12 Acoustical Tile—Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.

13 SHEETROCK brand Exterior Gypsum Ceiling Board—Exposed surfaces should receive two coats of good quality exterior paint. First coat: oil-based primer; second coat: either alkyd or latex exterior paint.

14 Shadowing—During periods of low outside temperature, airborne dirt may collect, producing photographing or shadowing over fasteners and furring of exterior walls. This natural phenomenon occurs through no fault of the products.

15 WARNING: COMBUSTIBLE. Rigid foam (cellular plastic) insulation will ignite if exposed to fire of sufficient heat and intensity. Use only as directed by the specific instructions accompanying the product.

16 Additional Information—See technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels & Accessories SA-927* for information on system components; *Texture and Finish Products SA-933* for finishing product specifications; *DUROCK Interior Cement Board Folder SA-932* for data on ceramic tile base.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A** Gypsum Board—48" wide—(¼") (⅜") (½") (¾") thick (Regular) (Foil-Back) SHEETROCK brand Gypsum Panels; (½") (¾") thick (Foil-Back) SHEETROCK brand Gypsum Panels, FIRECODE (C); (½") (¾") thick SHEETROCK brand Gypsum Panels, Water-Resistant; (½") thick SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C; (¾") thick SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE; (½") (¾") thick SHEETROCK brand (FIRECODE) Exterior Gypsum Ceiling Board; ½" thick SHEETROCK brand Interior Gypsum Ceiling Board—lengths as required.
- B** Sheathing—½" x (24" wide) (48" wide) SHEETROCK brand Gypsum Sheathing; ¾" x (24" wide) (48" wide) SHEETROCK brand Gypsum Sheathing, FIRECODE; ½" x (24" wide) (48" wide) GYP-LAP Gypsum Sheathing; ¾" x (24" wide) (48" wide) GYP-LAP (Type X) Gypsum Sheathing.
- C** Joint Treatment—(select a United States Gypsum Company Joint System).
- D** Adhesive
 - (for Back-Blocking and Fire-Rated Double-Layer Systems).
 - SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Joint Compound Ready-Mixed—(All Purpose) (Taping).
 - (for Non-Rated Double-Layer Systems)—Laminating or Liquid Contact Adhesive.
 - (for Adhesive Application)—Drywall Stud Adhesive (must comply with ASTM C557 in partitions.).
 - (for Non-Rated Systems—specify with adhesive above).
 - Vinyl Foam Tape.
- E** Fasteners
 - Screws (1¼" Type W) (1½" Type G) (¾", 1", 1½", 1¼", 1⅝", 1⅞" Type S) (1" Type S-12).
 - (for Non-Rated Systems)—1¼", 1⅝" (Annular Ring Drywall) (Cement Coated Cooler) Nails—obtain locally.
 - (for Fire-Rated Systems)—specify from fire test report.
 - (for sheathing)—11-ga. (⅞") (1") dia. head galvanized roofing nails (1½") (1¾") long—obtain locally.
- F** SHEETROCK Trim No. (200-A) (401) (402) (P-1) (801-A) (801-B).
- G** Corner Bead—(No. 103 DUR-A-BEAD) (No. 104 DUR-A-BEAD) (SHEETROCK No. 800) Metal Corner Reinforcement.
- H** SHEETROCK Zinc Control Joint No. 093.
- I** RC-1 Resilient Channel.

- J** THERMAFIBER Sound Attenuation Fire Blankets (1½") (2") (3")x16" or 24"x48"; THERMAFIBER Fire-Safety FS-15 Blankets (1") (2") (3") (3½") (5¼") (6") x 15" or 23" x 48".

- K** Sealant—SHEETROCK Acoustical Sealant.

Part 3: Execution

3.1 Single-Layer Systems

3.1.1 Gypsum Panel Erection—Direct Attachment

Apply gypsum panels to ceilings first, then to walls. Place panels (perpendicular to framing) (parallel to framing). When using perpendicular application, position all ends over framing members. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within field of panel in a workmanlike manner. Cut panels with a razor knife and straight edge. Avoid cutting with power tools. If cut with a power tool, tool must be equipped with a dust collector.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least ⅜" from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple ⅓" deep. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by:

- A** **Standard single nailing method**—Attach panels with specified nails spaced 7" o.c. max. for ceilings, 8" o.c. max. for walls.
 - B** **Adhesive application**—Attach gypsum panels with drywall stud adhesive applied in a continuous ⅜" bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply two beads permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Hand impact panel along framing to insure contact at all points.
 - C** **Double-nailing method**—Attach gypsum panels with nails spaced 12" o.c. with second nails in close proximity (2" away).
 - D** **Power-driven screws**—Attach gypsum panels with 1¼" Type W screws—spaced 16" o.c. max. for walls, 12" o.c. for ceilings.
 - E** **Vinyl Foam Tape**—Attach gypsum panels, using stud adhesive and 8" tape strips applied according to manufacturer's directions.
- ##### 3.1.2 SHEETROCK brand Gypsum Panels, Water-Resistant, Erection
- A** **Framing**—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over ⅝" thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.
 - B** **Gypsum Panels**—After tub, shower pan or receptor is installed, place temporary ¼" spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, brush thinned tile adhesive over all cut or exposed panel edges at utility holes, joints and intersections.

Install panels perpendicular with paperbound edge abutting top of spacer strip. Fasten panels with nails 8" o.c. max., or screws 12" o.c. max. Where ceramic tile more than ⅝" thick will be used, space nails 4" o.c. max. and screws 8" o.c. max. Adhesive application (see 3.1.1 B above) may be used for attaching panels when ceramic tile no more than ⅝" thick will be used.

In areas to be tiled, treat all fastener heads with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound. Fill tapered edges in gypsum panel with this SHEETROCK Setting-Type Compound, embed SHEETROCK Joint Tape firmly and wipe off excess compound. Follow immediately with a second coat over the taping coat, being careful not to crown the joint. Fold and embed tape properly in all interior angles to provide a true angle.

In areas not to be tiled, embed tape and treat fasteners with SHEETROCK Setting-Type (DURABOND 45 or 90) or Lightweight Setting-Type (EASY SAND 45 or 90) Joint Compound applied in the conventional manner. Finish with at least two coats of joint compound applied according to directions.

Prior to tile erection, seal cut panel edges of all openings around pipes, fittings and fixtures with thinned tile adhesive. Remove spacer strips, but do not caulk gap at bottom of panels. *Note*—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between the tile and shower floor or tub.

3.1.3 Floating Interior Angle System

Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8" from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.

3.2 Double-Layer Systems

3.2.1 Base Layer Erection—Direct Attachment

A Ceilings—Apply gypsum panel base layer on ceilings first (perpendicular to framing) (parallel to framing). Position end joints to offset face layer joints by at least 10", joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

B Sidewalls—Apply gypsum panel base layer with long edges centered on framing members (parallel). When predecorated face layers will be used, apply base layer horizontally. Apply foil-back panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

C Screw Attachment—Attach panels with power-driven 1½" Type W screws spaced 16" o.c. max. for walls, 12" o.c. max. for ceilings. Stagger screws on adjoining edges and ends.

D Nail Attachment—Attach panels with specified nails spaced 8" o.c. max. for walls, 7" o.c. max. for ceilings. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners ¾" min. from ends and edges.

3.2.2 Face Layer Erection—Direct Attachment

Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 10" from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer's directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction on walls, apply specified SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Joint

Compound Ready-Mixed (Taping or All Purpose) to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately ¾" wide at base and ½" high and spaced 1½" to 2" o.c. Laminate face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

A Temporary nailing—Use double-headed nails with at least ¾" penetration into framing. Space nails 16" to 24" o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

B Temporary supports—Brace or shore face layer every 16" to 24". When proper bond is developed, remove supports.

C Screws—Permanently attach face layer with 1½" Type G screws. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" max. and within 24" of ends.

Strip Lamination—For fire-rated construction on walls, apply specified SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed to base layer panels in vertical strips of four ½" beads, 1½" to 2" o.c. Space strips 24" o.c. Permanently attach face layer with 1½" Type G screws placed to penetrate adhesive strips. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of both ends.

For non-rated construction, laminate face to base layer as follows:

Laminating Adhesive—Apply adhesive in strips using notched spreader having ¼"x ¼" min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16" o.c. at top and bottom of panel. For ceilings, space fasteners 16" o.c. along edges and ends, with one permanent fastener per framing member at mid-width of panel.

Liquid Contact Adhesive—Apply adhesive to both contact surfaces according to manufacturer's directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For perpendicular application to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48" o.c. max. For parallel application to walls, use pre-bowed panels and fasten 16" o.c. at top and bottom of panel.

Vinyl Foam Tape—Attach gypsum panels, using laminating adhesive and vinyl foam tape applied in continuous strips across back face of panel according to manufacturer's directions.

For mechanical attachment in non-rated construction, space nails 7" o.c. on ceilings, 8" o.c. walls; space screws 12" o.c. on ceilings, 16" o.c. on walls.

3.2.3 Face Layer Erection—TEXTONE Vinyl-Faced Gypsum Panels

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10" from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using specified SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed as laminating adhesive. Apply adhesive to base layer in vertical strips of four ½" beads, 1½" to 2" o.c. Space strips 24" o.c. Fasten panels 16" o.c. at top and bottom of panel.

For non-rated construction, install face layers, using (laminating) (liquid contact) adhesive as follows:

- A Laminating Adhesive**—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ " x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.
- B Liquid Contact Adhesive**—Apply adhesive to both contact surfaces according to manufacturer's directions; let adhesive air-dry; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16" o.c. at top and bottom. Finish joints, edges, corners with TEXTONE Mouldings matching panel finishes and installed according to manufacturer's directions.

3.3 Resilient Attachment Systems

3.3.1 Resilient Channel Erection

Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to each support with $1\frac{1}{4}$ " Type W or $1\frac{1}{4}$ " Type S screws driven through holes in channel mounting flange.

On walls, install channels with mounting flange down. (Channel may be inverted at floor to accommodate attachment of base.) Locate channels 2" from floor and within 6" of ceiling. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double-layer system, attach channel through base layer to framing with $1\frac{1}{2}$ " Type S screws. Splice channel by nesting directly over framing member, screw-attach through both flanges. Reinforce with $\frac{3}{8}$ " pan head screws located at both ends of splice. Use of a filler strip at the base may reduce STC rating.

Where cabinets are to be installed, attach RC-1 Resilient Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at mid-point between hangers.

Note: Screws attaching cabinets to resilient channels should be placed between studs. Screws that contact studs reduce the system's resiliency and sound rating.

3.3.2 Gypsum Panel Erection—Ceilings

- A Base Layer**—For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered. Fasten panels to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with $1\frac{1}{2}$ " Type S screws spaced 24" o.c. for joists 16" o.c.; spaced 16" o.c. for joists 24" o.c.

- B Face Layer**—Apply face-layer panels of maximum practical length with long dimension perpendicular to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" Type S screws spaced 12" o.c. in field of panels and along abutting ends. Cut panels neatly and provide support at cutouts and openings.

3.3.3 USG High Performance Floor/Ceiling System

- A Floor**—Apply $\frac{3}{8}$ " bead of SHEETROCK Acoustical Sealant to the center of the top flange of the joists. Place $\frac{1}{2}$ " thick min. APA span rated exterior grade plywood sheets with long dimension across wood joists spaced 16" o.c. Fasten plywood to wood joists with (6d)(8d) cc sinkers 6" o.c. along supported ends and 10" o.c. at intermediate joists.

Install SHEETROCK brand Gypsum Liner Panels after the structure is fully enclosed and all interior partitions are installed. Loose lay the liner panels on the subfloor with the long dimension at a right angle to the wood joists. Stagger panel end joints and fit panels closely to wall intersections without forcing. Seal the perimeter of the floor with SHEETROCK Acoustical Sealant to provide an airtight seal.

Finish floor with DUROCK Exterior Cement Board and ceramic tile or oriented strand board and vinyl tile or carpet. See Technical Data Sheet WB-1868 for installation information. (Note: SHEETROCK brand Gypsum Liner Panel floor underlayment is not intended for use in areas subject to prolonged contact with water—e.g. gang showers, etc. For applications in these areas, substitute a double layer of $\frac{1}{2}$ " DUROCK Exterior Cement Board for gypsum liner panels to achieve comparable fire- and sound-rated performance).

- B Cavity**—Install 3" thick THERMAFIBER SAFB to fit snugly between all floor joists. Support each batt with four spring steel wire rods (0.087" dia. typical) uniformly spaced to hold the batts approximately 1" above the bottom of the joists. Butt ends tightly and fill all voids.

- C Ceiling**—Apply RC-1 Resilient Channels 16" o.c. perpendicular to joists and fastened with $1\frac{1}{2}$ " Type S screws. Attach base layers of $\frac{5}{8}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core, perpendicular to channels with 1" Type S screws 16" o.c. at channels, 8" o.c. at panel ends. Attach face layers with $1\frac{1}{2}$ " Type S screws 8" o.c. at channels, with $1\frac{1}{2}$ " Type G screws 8" o.c. at panel ends, staggering screws 4" from screws in base layer. Treat joints and fasteners with SHEETROCK joint system. Seal perimeter with SHEETROCK Acoustical Sealant.

3.3.4 Gypsum Panel Erection—Walls

Apply resilient channel per 3.3.1. Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1" Type S screws spaced 12" o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used, but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8" o.c.

For two-layer application of gypsum panels, apply base layer perpendicular to resilient channels and attach to channels with 1" Type S screws spaced 24" o.c. and to wood studs with $1\frac{1}{2}$ " Type W screws 16" o.c. Apply face layer with long dimension perpendicular to long edges of base layer and fasten with $1\frac{1}{2}$ " Type S screws 16" o.c.

3.4 Wall Furring Systems

3.4.1 Single-Layer Application—Direct Attachment

Space suitable wood furring strips 16" o.c. and attach to masonry walls. Apply gypsum panels of maximum practical length with long dimension perpendicular to furring strips. Fasten panels with $1\frac{1}{4}$ " Type W screws spaced 16" o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

3.4.2 Mechanical Application—SHEETROCK Z-Furring Channels

Erect insulation vertically on interior of masonry and concrete walls and hold in place with SHEETROCK Z-Furring Channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner. On adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with a standard width insulation panel and continue in regular manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold mineral-fiber insulation in place until gypsum panels are installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment and support of fixtures and furnishings.

Apply gypsum panels parallel to channels with edge joints occurring over channels. Use no end joints in single-layer application. Attach gypsum panels with 1" Type S screws spaced 16" o.c. in field of panels and at edges, and with 1½" Type S screws spaced 12" o.c. at exterior corners. For double-layer application, apply base layer parallel to channels, face layer either perpendicular or parallel to channels with vertical joints offset at least one channel. Attach base layer with screws 24" o.c. and face layer with 1½" screws 16" o.c.

3.5 Gypsum Sheathing Application

Apply 24" wide sheathing horizontally with tongue edge up. Install supplementary bracing as required by applicable code. Fasten sheathing with nails spaced 8" o.c. along each stud.

Apply 48" wide sheathing vertically with bottom edge bearing on foundation or subfloor. Install supplementary bracing (and adhesive) as required by applicable code. Fasten sheathing to studs and plates with nails 8" o.c.

3.6 Exterior Ceilings and Soffits

Apply SHEETROCK brand Exterior Gypsum Ceiling Board (perpendicular to supports) (parallel to supports) with end joints over supports and with ¼" to ½" space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12" o.c. or nails spaced 8" o.c. Where specified, cover joints with wood battens securely fastened to framing. Finish joints, trim and fasteners with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound applied according to directions.

3.7 Accessory Application

- A Joint System**—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System applied according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- B Corner Bead**—Reinforce all vertical and horizontal exterior corners with corner bead fastened with nails or ⅝" galvanized staples 9" o.c. on both flanges along entire length of bead.
- C Metal Trim**—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9" o.c.
- D P-1 Vinyl Trim**—Slip trim over gypsum panel edge with long flange behind panel. Install panel with trim firmly abutting surface.
- E Screws**—Power-drive at least ¾" from edges or ends of gypsum panels to provide uniform dimple ½" deep.
- F Control Joints**—Break gypsum panels and resilient channels behind joint and back by double supports. Apply acoustical sealant to fill gap and attach control joint to face layer with nails or ⅝" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Sales Offices

Arizona:	Phoenix, (602) 866-0795
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Florida:	Jacksonville, (904) 764-3293 Miami, (305) 557-4501
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Technical Services:	Contact the following offices for technical assistance concerning design, materials, systems, detailing and specifications.
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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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United States Gypsum Company

101 South Wacker Drive
 Chicago, Illinois 60606-4385
 A Subsidiary of USG Corporation

SA-924/1-92 Printed in U.S.A.

USG Area Separation Wall Systems



For multi-family residential fire wall construction

USG

Description

USG Area Separation Walls are remarkable developments for constructing common walls with fire-resistive protection for adjacent properties. These lightweight, non-load bearing gypsum drywall assemblies are designed as vertical fire barriers for fire walls and party walls separating occupancies in wood-frame apartments and townhouses. They are the essence of simplicity—large-size gypsum panels used in construction with steel studs and runners quickly become thin, space-saving walls offering remarkable acoustical privacy. Their engineered performance and low labor and material costs make these systems superior to the usual masonry construction.

Available in two basic systems both providing fire-resistant walls from ground level to roof:

Solid Type, with independently framed interior gypsum panel surfaces both sides of fire wall or party wall.

Cavity Type, with integral interior gypsum panel surfaces for commonly shared party walls between apartments.

Solid-Type Wall consists of two 1" thick SHEETROCK brand Gypsum Liner Panels installed vertically between 2" USG Steel C-Runners. Panel edges are inserted in 2" USG Steel H-Studs spaced 24" o.c. C-runners are installed at top and bottom of wall and back-to-back between vertical panels cut to a convenient length above each intermediate floor. Studs are attached to wood framing at intermediate floors with 0.063" USG aluminum angle clips which break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact. An additional clip-to-stud attachment is required 5' o.c. below the top 23' of the building.

With 25-ga. steel H-studs, the assemblies are suitable for floor-to-ceiling heights (i.e. between clip angle supports) up to 10' under 5-psf lateral load and up to 8' as an exterior wall under 15-psf wind load without exceeding L/240 allowable deflection.

With 2" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) stapled each side of liner panels, the assembly has obtained a 3-hr. fire resistance rating allowing separate selection and construction of tenant walls.

Cavity-Type Wall consists of steel C-H Studs and SHEETROCK brand Gypsum Liner Panels set in steel runners and faced both sides with SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core. Liner panels, 1" thick, are erected vertically with ends set into 2½" USG C-Runners and edges inserted into specially formed 2½" USG Steel C-H Studs. C-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line above each intermediate floor. Aluminum clips, which attach the studs to adjacent wood framing, break away in the same fashion as with solid-type walls. To improve sound transmission loss, THERMAFIBER SAFB are inserted in the stud cavity and RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) may be used to isolate the face layer.

With 212CH25 steel studs spaced 24" o.c., the systems are suitable for floor-to-ceiling heights up to 10' under 5-psf lateral load and up to 8' as exterior walls under 15-psf wind load without exceeding L/240 deflection. For buildings over 23' in height, use 400CH20 studs on the lower floors below the top 23' of the building.

Components used in these systems are designed to permit temporary exposure to inclement weather during construction. Construction using the USG Aluminum Breakaway Clip is covered by U.S. Patent No. 3,974,607.



a



b



c

a. USG Steel H-stud slides in place over SHEETROCK brand Gypsum Liner Panels.

b. USG Steel C-Runner fits over studs and panels. Second C-runner is then screw-attached back-to-back to lower runner to hold next level of studs and liner panels.

c. USG Aluminum Breakaway Clip is screw-attached to studs and framing. Under fire exposure, clip breaks away, permits fire-damaged wall to fail, leaving separation wall intact.

Function and Utility

These systems may be used in buildings up to four stories high (44') and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when building offsets are desired; also for use with flat wood decks.

Fire Resistance—Both types of Separation Walls offer 2-hr. and 3-hr. fire ratings.

Sound Isolation—STC ratings up to 60 with the solid system and 57 in the cavity system are available.

Lightweight—These drywall assemblies weigh at least 50% less than masonry walls typically used. This fact speeds installation.

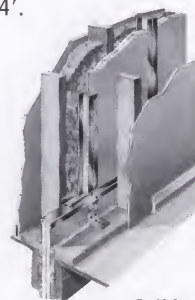
Space-Saving—Use of these assemblies gains valuable floor space. Thickness is 3½" to 4" for Cavity Type Walls, compared to 8" to 12" for a masonry wall without interior finish.

Weather Resistance—Moisture-resistant components permit installation in any weather men can work—eliminate many costly winter construction delays.

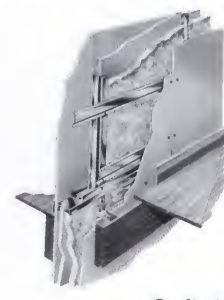
Code Compliance—In compliance with fire resistance requirements under evaluation reports of BOCA Report No. 87-63 and SBCII Report No. 9137.

Limitations

Non-load bearing; max. frame spacing: 24"; not recommended for shear walls without suitable diagonal bracing; max. building height: 44'.



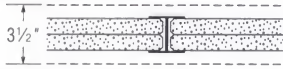
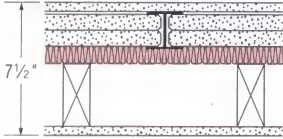
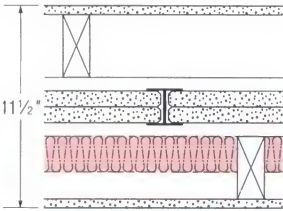
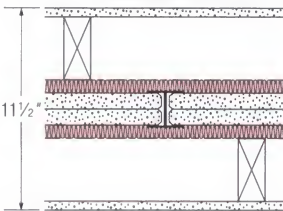
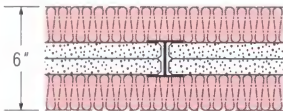
Solid-type



Cavity-type

Test Data

 THERMAFIBER Insulation

Fire rating	Fire-rated construction Detail & physical data	Description & test no.	Acoustical performance		System reference
			STC	Description & test no.	
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—min. 3/8" air space both sides separating liner panels from any adjacent construction— UL Des U336	N/A		A
2 hr. est.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—1" THERMAFIBER SAFB stapled over gypsum liner panels—3/8" SHEETROCK brand gypsum panels—perim caulked—est. fire rating based on WHI-495-PSV-0245	47	Based on no SAFB— TL-88-234	B
2 hr.		Solid Area Separation Wall—1/2" SHEETROCK brand gypsum panels—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c. 2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/8" from liner panels—2" THERMAFIBER SAFB in one cavity—gypsum panels att with 1 1/4" Type W screws 12" o.c.—joints stag & fin.—perim caulked— UL Des U336	54 46 58 57 60 45 54 57	TL-88-348 Based on 2x4s and no SAFB— TL-88-353 Based on 2x4s and 2" SAFB on both sides— TL-88-347 Based on 2x4s and 3" SAFB on one side— TL-88-351 Based on 2x4s and 3" SAFB both sides— TL-88-350 Based on 2x3s, 3/8" gypsum panels, no SAFB— BBN-730104 Based on 2x3s, 3/8" gypsum panels, 2" SAFB one side— BBN-730103 Based on 2x3s, 3/8" gypsum panels, 2" SAFB both sides— BBN-730102	C
2 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2x4 wd studs 16" o.c. each side on 2x4 plates min. 3/8" from liner panels—1" THERMAFIBER SAFB stapled to both sides of liner panels—1/2" SHEETROCK brand gypsum panels facing ea side— WHI-495-PSV-0245	53 50	TL-88-346 Based on 1" SAFB one side— TL-88-344	D
3 hr.		Solid Area Separation Wall—two 1" SHEETROCK brand gypsum liner panels set betw USG one-piece steel H-studs 24" o.c.—2" THERMAFIBER SAFB both sides—bltks appl horiz with joints stag and staple-att to liner panels— WHI-495-0393/0394	N/A		E

Description

Two-hour fire rated solid area separation walls consist of a fire barrier of two 1" SHEETROCK brand Gypsum Liner Panels inserted between USG Steel H-Studs 24" o.c. set in runners. This barrier wall is finished one or both sides with 1/2" SHEETROCK brand Gypsum Panels, 1/2" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or 3/8" SHEETROCK brand Gypsum Panels, FIRECODE Core, applied direct to USG Steel H-Studs or to separate framing. With 2" THERMAFIBER

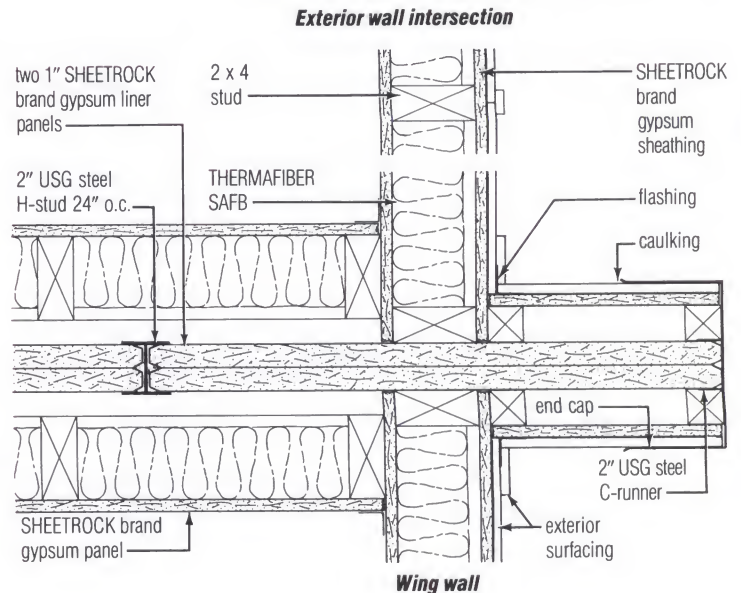
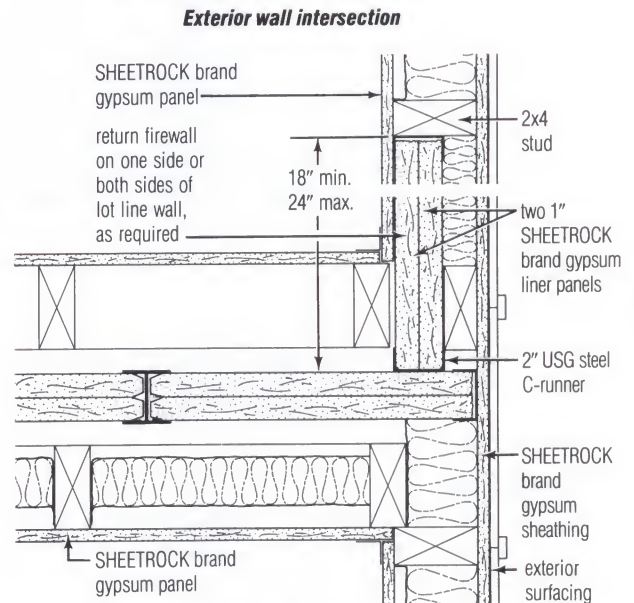
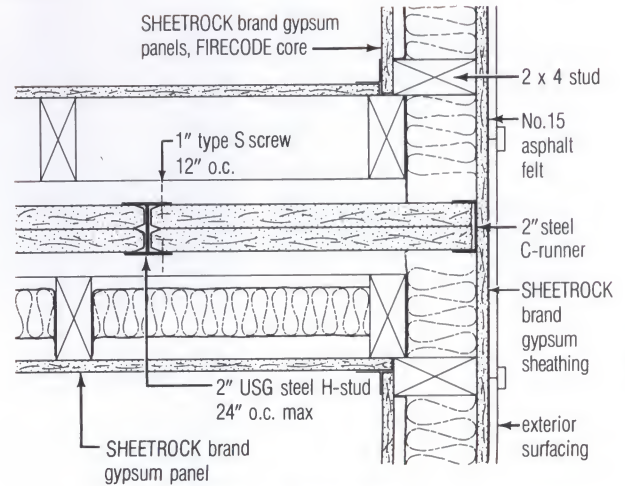
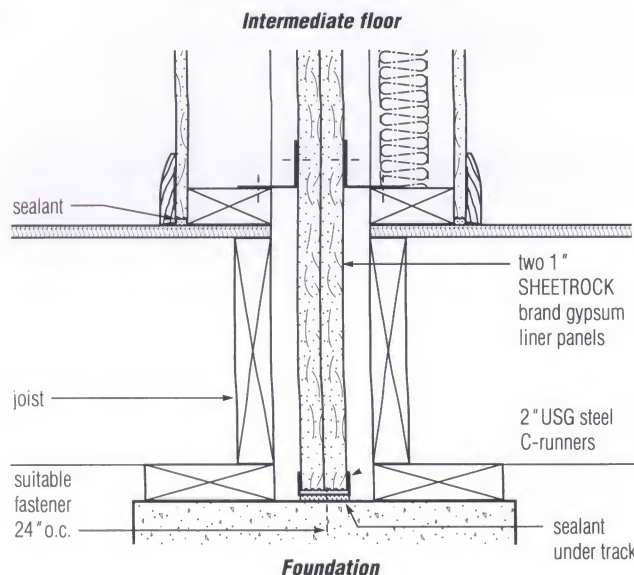
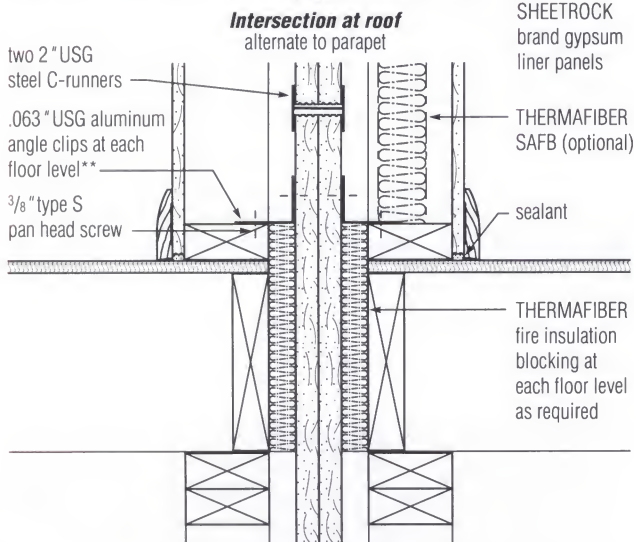
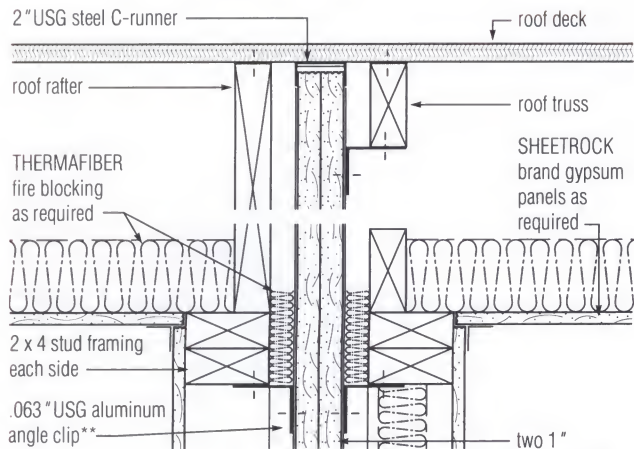
SAFB stapled to each side of liner panels, the assembly offers 3-hr. fire resistance. Check local code for acceptable system.

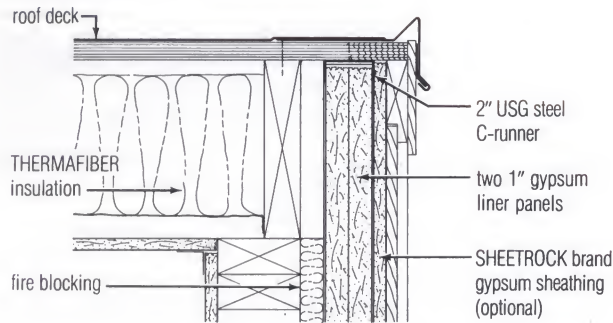
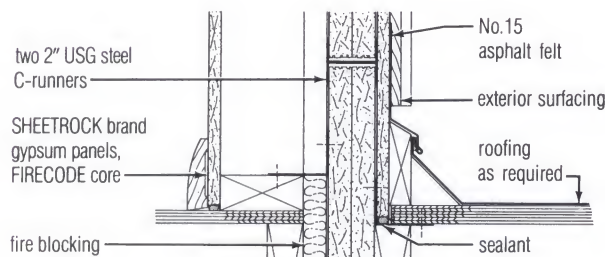
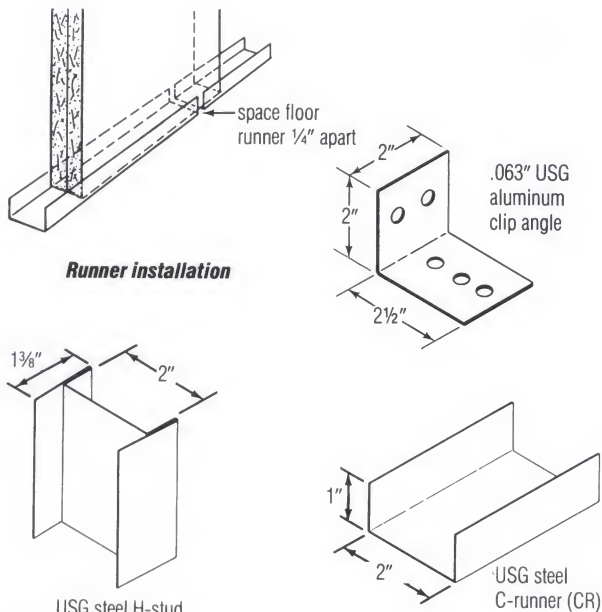
Sound isolation up to 57 STC is offered depending on the interior wall construction used. Systems using steel studs or wood studs provide the same sound control. Based on the location in the building the area separation wall can be varied to provide the framing and finish desired. Consult local code for limiting criteria.

Sound Transmission Loss—db

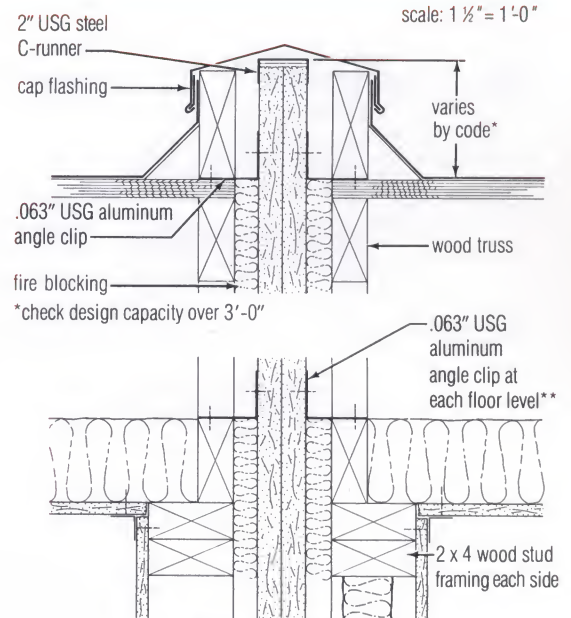
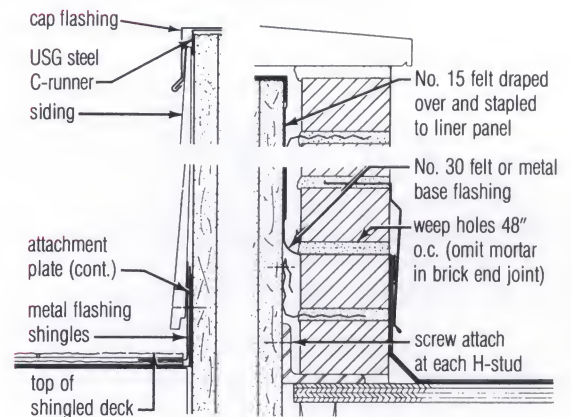
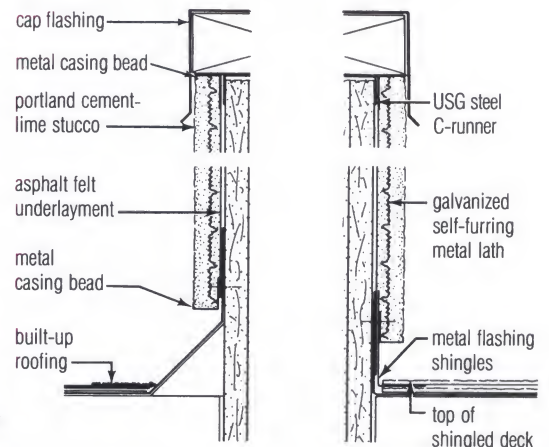
Test no.	Method	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
TL-88-350	Lab	40	45	50	49	53	53	55	57	62	65	67	69	72	70	68	71	60
TL-88-347	Lab	34	40	48	48	50	52	55	56	61	64	66	69	72	70	69	73	58
BBN-730102	Lab	36	38	46	52	53	56	57	56	59	59	59	60	59	57	58	66	57
TL-88-351	Lab	36	36	45	47	51	52	54	56	61	64	66	69	72	71	69	73	57
USG-840325	Lab	33	35	43	49	55	56	58	61	64	66	68	71	74	72	71	74	56
TL-88-233	Lab	37	39	45	47	52	53	53	56	59	58	56	56	57	59	59	59	56
BBN-730103	Lab	34	33	43	51	52	54	57	56	60	60	58	60	60	57	58	66	54
TL-88-348	Lab	31	33	42	45	48	49	52	54	59	63	65	68	70	68	67	71	54
TL-88-346	Lab	29	32	44	45	49	49	50	51	57	62	65	68	71	69	67	69	53
TL-88-344	Lab	29	29	37	43	46	44	47	49	55	61	64	66	70	70	69	71	50
TL-88-234	Lab	31	28	31	34	38	42	44	49	52	55	58	60	61	62	61	63	47
TL-88-353	Lab	26	25	29	35	39	45	47	52	58	61	65	69	71	67	67	70	46
BBN-730104	Lab	28	24	28	37	40	46	50	53	58	60	59	60	58	57	59	66	45

Note: As required by code, 5/8" SHEETROCK brand gypsum panels, FIRECODE core, may be used as underlayment to the untreated roof sheathing with panels extending 4' on both sides of area separation wall and possibly roof side at rake end. Clip placement below is for typical construction.



**Roof at rake end****Intermediate floor
pitched or flat roof****Runner installation****Steel components** (solid wall)

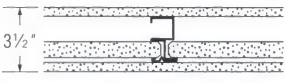
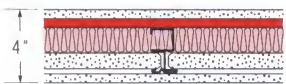
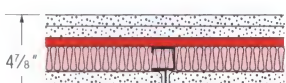
****Note:** additional clip angles are needed midheight between floors (5' o.c. max.) for area below top 23' of building up to 44'.

**Typical roof parapets**
(Height as required by code)**Wood siding****Masonry veneer****Stucco****Stucco**

Test Data

 **RC-1™ Resilient Channel**

 **THERMAFIBER Insulation**

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
2 hr.		Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked— U of C 6-23-75 wt 9 width $3\frac{1}{2}$ "	47	Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core, and 1" SAFB in cavity— BBN-750704	A
2 hr. est		Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, water-resistant, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels— $\frac{1}{2}$ " THERMAFIBER SAFB—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked—est. fire rating based on U of C 6-23-75 wt 10 width 4"	50	Based on $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core— BBN-750411	B
3 hr. est		Cavity Area Separation Wall— $\frac{1}{2}$ " SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels— $\frac{1}{2}$ " THERMAFIBER SAFB—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints fin—perim caulked—est. fire rating based on U of C 2-16-72 wt 14 width $4\frac{1}{8}$ "	57	BBN-730622	C

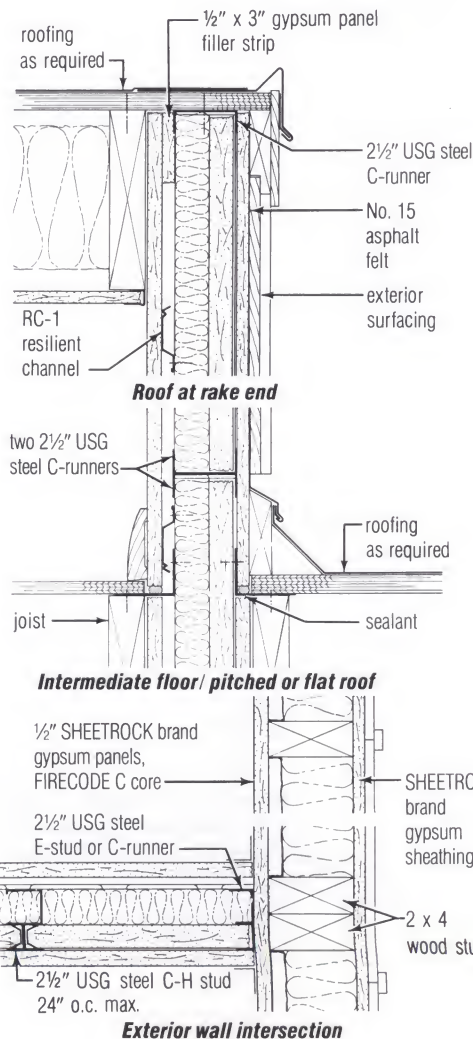
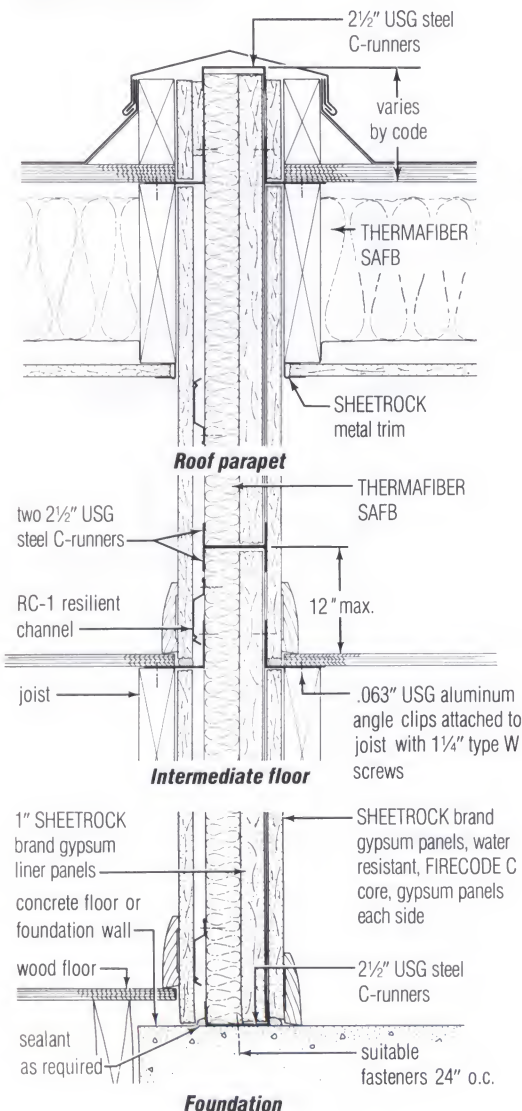
Description

Cavity area separation walls are used as a commonly shared party wall and fire barrier with non-load bearing framing. They consist of USG Steel C-H Studs and 1" SHEETROCK brand Gypsum Liner Panels set in USG Steel C-Runners and faced both sides with $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, FIRECODE C Core.

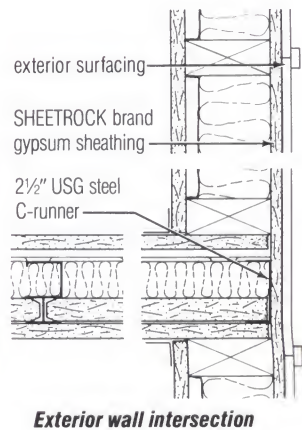
With 1" THERMAFIBER SAFB in the stud cavity, 47 STC sound isolation is obtained.

Sound control of 50 STC is achieved with $\frac{1}{2}$ " SAFB inserted in the stud cavity and RC-1 Resilient Channels screw-attached to studs to isolate the face layer. A 3-hr. fire-rated assembly, with $\frac{1}{2}$ " SAFB in the stud cavity, resilient channels and double-layer panels screw-attached to the channels, offers 57 STC sound control (see details).

scale: $1\frac{1}{2}" = 1'-0"$



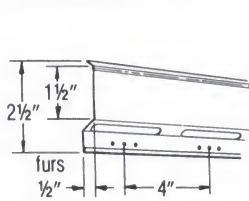
Note: Use 400CH20 studs for area below top 23' of building up to 44'. Clip placement may vary but not to exceed 10' o.c.



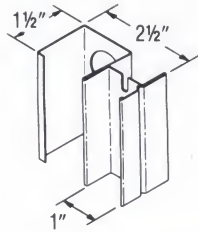
Sound Transmission Loss—db

Test no.	Method	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
BBN-730622	Lab	35	38	44	50	51	55	56	55	61	63	62	65	65	60	57	64	57
BBN-750411	Lab	26	32	42	44	48	51	53	54	58	60	59	61	61	57	56	60	50
BBN-750704	Lab	23	26	35	39	43	48	49	51	54	58	58	60	60	55	51	53	47

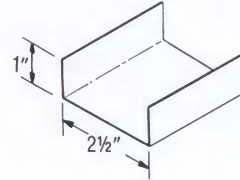
Steel components (cavity wall)



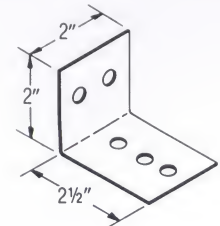
RC-1™ Resilient Channel



USG Steel C-H Stud (CH)



USG Steel C-Runner (CR)



.063" USG Aluminum Angle Clip

Good Design Practices

- System Performance**—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products manufactured and assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- Control Joints**—Gypsum panel surfaces should be isolated with control joints or other stress relief where: (a) partition abuts a structural element (except floor) or dissimilar wall or ceiling; (b) construction changes within the plane of the partition; (c) partition run exceeds 30'; (d) expansion or control joints occur in the base exterior wall.
- Sound Control Construction**—Where these constructions are used for sound control, seal the partition perimeter with 1/4" min. round bead of SHEETROCK Acoustical Sealant. Seal around all cutouts for lights, cabinets, pipes, ducts and electrical boxes. Flanking paths and back-to-back penetrations of the diaphragm should be eliminated. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction. Door and borrowed-light openings are not recommended.
- Wood Framing Requirements**—Wood framing meeting the minimum requirements of local building codes is necessary for proper performance.
- Fixture Attachment**—Lightweight fixtures and trim should be installed using expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.
- Cavity Type Walls**—SHEETROCK brand Gypsum Panels, FIRECODE C Core, may be used when partitions will not be exposed to moisture or inclement weather during construction. If weather exposure is expected, panels must be protected.
- Additional Information**—See technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels and Accessories Folder SA-927* for information on systems components; *Texture and Finish Products Folder SA-933* for finishing product specifications; *THERMAFIBER Life-Safety Fire Containment Systems Folder SA-707* for insulation specifications.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

- A** All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.
- B** System must be recognized by and built in accordance with model code report.
- C** Solid-type wall must obtain a 2-hr. fire rating without the use of battens covering steel components.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Installed panels should be protected from the environment and dry before enclosing the wall.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperature within the building shall be maintained within the range of 55° to 70° F (13° to 21° C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A** Gypsum Board—48" wide, (1/2") (3/8") thick (Regular) (Foil-Back) SHEETROCK brand (Water-Resistant) (FIRECODE C) (FIRECODE) Gypsum Panels—lengths as required.
- B** Liner Board—24" wide, 1" SHEETROCK brand Gypsum Liner Panels, beveled edge, lengths as required.
- C** USG Steel C-H Studs (212CH25) (400CH20), hot-dipped galvanized, lengths as required.
- D** USG Steel H-Studs one piece (200HS25), hot-dipped galvanized, lengths as required.
- E** USG Steel E-Studs 212ES25, hot-dipped galvanized, lengths as required.
- F** USG Steel Runners (200CR25) (212CR25) (400CH26), hot-dipped galvanized, x 10' length.
- G** USG Aluminum Angle Clip—2" x 2 1/2" x 0.063" Aluminum Breakaway Clips.
- H** Joint Treatment—(select a United States Gypsum Company Joint System).
- I** Fasteners—Screws (1 1/4" Type W) (1", 1 1/4", 1 3/8" Type S) (3/8" Type S, pan head) (Galvanized staples, 3/8" crown, 1 1/2" leg).
- J** SHEETROCK Trim No. (200-A) (401) (402) (801-A) (801-B).
- K** SHEETROCK Zinc Control Joint No. 093.
- L** RC-1 Resilient Channel.

M THERMAFIBER Sound Attenuation Fire Blankets (1") (1½") (2") (3") x 16" or 24" x 48".

N SHEETROCK Acoustical Sealant.

O THERMAFIBER Safing Insulation.

Part 3: Execution

3.1 Solid Wall

A Foundation—Position 2" wide steel C-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Space adjacent runner sections ¼" apart. When specified, caulk runner at foundation with ¼" bead of acoustical sealant.

B First Floor—Install H-studs and liner panels at a convenient length more than floor-to-floor height. Install two thicknesses of 1" liner panels vertically in C-runner with long edges in H-stud. As an option, H-stud and C-runner may be screw-attached at the end that is fully engaged to runner. Erect H-studs and double-thickness liner panels alternately until wall is completed. Cap top of panels with horizontal C-runner. Fasten all corner C-runner flanges both sides with ⅝" Type S screws.

C Intermediate Floors—Install back-to-back C-runners and screw-attach together with double ⅝" Type S screws at ends and spaced 24" o.c. Secure studs to framing with 0.063" aluminum angle clips screw-attached to both sides of each stud and framing. Locate horizontal runner joint within 2' of intermediate floor. Except at foundation, install fire stopping between joists and fire barrier.

D Roof—Continue erecting studs and panels for succeeding stories as previously described. Cut liner panels and H-studs to pitch and length as necessary to follow roof pitch. At roof, cap panels with C-runner and fasten to framing with aluminum clips.

E Sound Attenuation Fire Blankets—When specified, install blankets with joints staggered. For direct attachment to 1" liner panels, attach blankets with seven ⅝" staples randomly driven through each blanket. Blanket installation within cavities is friction fit between stud framing.

F Interior Finish—Apply specified gypsum panels to wood studs and joists with screws or nails in conventional manner.

3.2 Cavity Wall

A Foundation—Position 2½" wide steel C-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. Caulk runner at foundation with ¼" bead of SHEETROCK Acoustical Sealant.

B First Floor—Install 1" liner panels and steel studs cut to a convenient length more than floor-to-floor height. Erect liner panels vertically in C-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud or C-runner. Fasten cap end flanges to C-runners with ⅝" Type S screws both sides.

C Intermediate Floors—Cap top of panels and studs with C-runner and fasten studs to C-runner flanges on alternate sides with ⅝" Type S screws. Install bottom C-runner for next row of panels over top runner with end joints staggered at least 12". Fasten runners together with double ⅝" screws at ends and spaced 24" o.c. Secure each stud to framing with 0.063" aluminum angle clip, fastened to both sides of each stud with ⅝" screws and to framing or subfloor with 1¼" Type W screws.

D Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with C-runner and fasten studs to flanges with ⅝" screws. Fasten studs to framing with aluminum clips.

E Sound Attenuation Fire Blankets—When specified, install blankets between studs and attach to liner panel with five ⅝"

staples driven through each blanket, one in center and others spaced 3" from each corner. Butt blankets closely and fill all voids.

F Resilient Channels—When specified, install RC-1 Resilient Channels horizontally to face side of studs, 6" above floor, 6" below ceiling joists and max. 24" o.c. Attach channels to studs with ⅝" Type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs or C-runners. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

G Gypsum Panels—Apply ½" SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" Type S screws spaced 12" o.c. in field and along edges and runner flanges.

H Resilient Single-layer—Apply ½" gypsum panels vertically to resilient channels and fasten with 1¼" Type S screws placed 6" away from stud and 12" o.c. Do not place screws directly over stud.

I Resilient Double-layer—Apply ⅝" gypsum panel base layer perpendicular to resilient channels with joints staggered; fasten with 1¼" Type S screws placed 6" away from stud and 12" o.c. Apply ⅝" gypsum panel face layer vertically over base layer with edge joints staggered and attach with 1¼" Type S screws spaced 12" o.c. and staggered from those in base layer.

3.3 Accessory Application

A Joint System—Finish all face panel joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

B Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with nails or galvanized staples 9" o.c.

C Screws—Power-drive at least ⅝" from edges or ends of gypsum panels to provide uniform dimple ½" deep.

D Control Joints—Break gypsum panels and resilient channels behind joint and back by double supports. Attach control joint to face layer with nails or ⅝" galvanized staples spaced 6" o.c. on both flanges along entire length of joint.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, SHEETROCK, FIRECODE, THERMAFIBER, RC-1.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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United States Gypsum Company

101 South Wacker Drive

Chicago, Illinois 60606-4385

A Subsidiary of USG Corporation

SA-925/1-92 Printed in U.S.A.

USG Cavity Shaft Wall Systems



For vertical and horizontal shaft enclosures in multi-story buildings—stairwell, elevator, mechanical and air duct

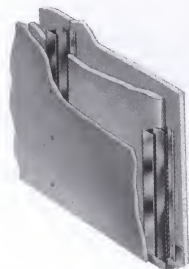
USG

Fire-Resistant Drywall Partitions for Enclosing Shafts in Multi-Story Buildings

2-hour assemblies



Double layer one side



Single layer both sides

Description

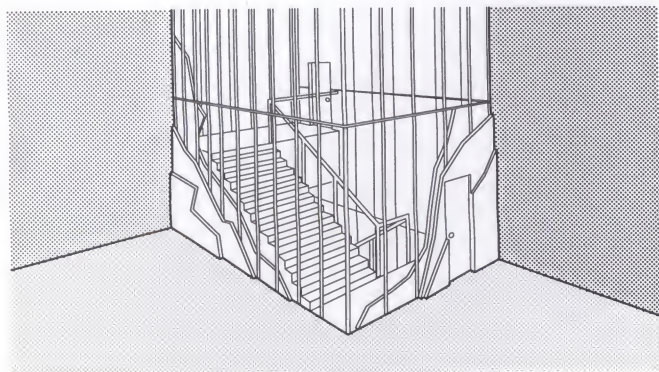
USG Cavity Shaft Walls offer high performance characteristics and greater economy than other shaft walls. Engineered design of the C-H stud system provides a thinner, lighter weight assembly that offers faster installation and lower material costs, producing lower in-place costs as well as savings in structural steel. In addition, USG Shaft Walls provide up to 4-hour fire resistance and sound ratings to 51 STC. They resist intermittent lateral loads up to 15 psf; also resist fatigue failure under cyclic lateral loading.

USG Cavity Shaft Walls are non-load bearing gypsum board partition assemblies designed for erection from outside the shaft at each floor. Shafts are enclosed early in construction, the walls finished later along with interior partitions. This fast-installation feature combined with low-cost materials and high performance values makes USG Cavity Shaft Walls superior enclosures for elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

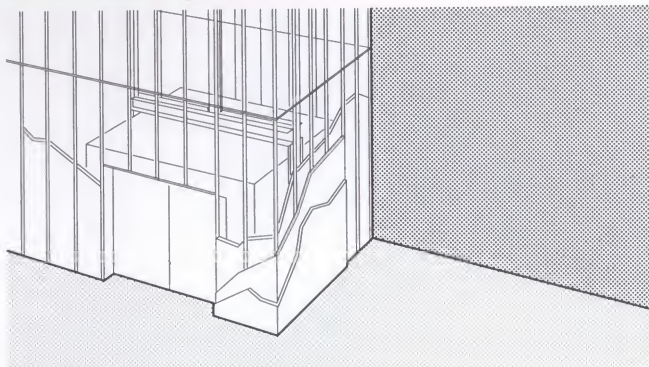
USG Cavity Shaft Walls are covered by three model building codes under NER 258. In addition to a 1½" deep x 22½" wide vertical chaseway, the C-H Stud used has 1" dia. holes 16" from each end for horizontal conduit runs. A 3" deep chase to carry electrical elevator controls is available with the 4" C-H Stud.

The assemblies are simply constructed of SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base and veneer finish, steel studs and runners, and SHEETROCK brand Gypsum Liner Panels.

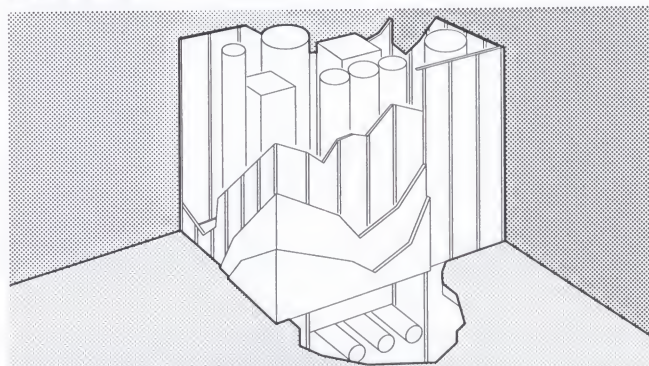
SHEETROCK brand Gypsum Liner Panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into specially formed USG Steel C-H Studs spaced 24" o.c. The 2-hour shaft wall is completed with double-layer ½" thick gypsum panels and a United States Gypsum Company joint system, or with gypsum base and veneer finish applied to one side.



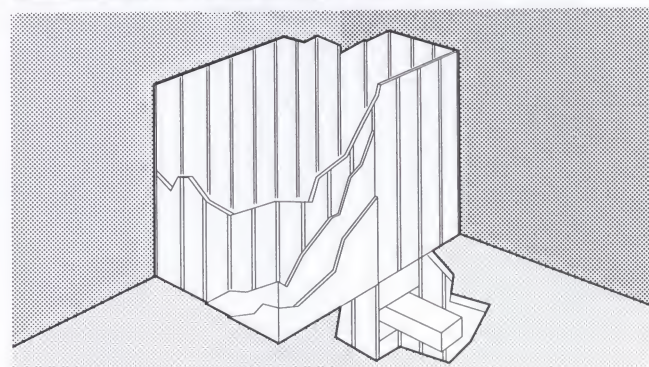
Stairwells



Elevator shafts



Mechanical shafts (HVAC, plumbing, electrical, etc.)



Air return shafts (unlined)

Where both sides of the wall must be finished, single-layer panels are applied to each side of studs. A 1-hour assembly is obtained with single-layer ¾" thick face panels. Additional layers of panels are installed in 3 and 4-hour fire-rated construction (see details, page 3).

Liner panels have a special fire-resistant core and multi-layered green paper facings that are treated to resist moisture penetration. The panels are 1" thick, 24" wide and have beveled edges. SHEETROCK brand Gypsum Panels, FIRECODE C Core, for these systems are ½" or ¾" thick and 4' wide. IMPERIAL FIRECODE C Gypsum Base, ½" or ¾" thick and 4' wide, has a high-strength, high-density core covered with special-absorption face paper for a veneer finish. USG Steel J-Runners, C-H Studs and E-Studs are formed from hot-dipped galvanized steel.

Twelve Reasons to Choose USG Cavity Shaft Wall

- 1 The basic system is UL classified—UL Designs U438, U459, U467 and U469.
- 2 National Evaluation Report (NER-258) assures acceptance by all three model code bodies—BOCA, ICBO, SBCCI.
- 3 All major elevator door manufacturers have tested their doors at UL in USG Cavity Shaft Wall, successfully using the U.S. Gypsum Company 3" leg, 20-ga. jamb strut detail.
- 4 ASTM E152 standard test for door frames doesn't allow

substitution—the door frame must be installed in the wall in which it was tested.

- 5 Fire-tested penetration details for call boxes and position indicators.
- 6 USG Steel C-H Stud offers continuous edge support of liner panel for airtight, smoke-tight, rattle-free performance.
- 7 USG Steel C-H Stud has no tabs to bend, break, cut installer's hands or delay the job.
- 8 USG Steel C-H Stud blank width is wider and contains 21% more steel than some competitive tabbed stud blanks, making it stronger and more resistant to fatigue.
- 9 Most comprehensive limiting height information allows for safer design practices.
- 10 Pressure tested to one million cycles proves system longevity.
- 11 Only wall for which a UL smoke and fire damper test is available.
- 12 More than 20 years of proven performance.

Engineered Performance to Meet Design and Fire Protection Requirements

Walls that enclose elevator shafts, stairwells and other vertical shafts are the most important walls in a building from a life-safety standpoint. Should a fire occur, firemen control the use of elevators; the stairwells provide the only means for human egress within the building. Since these walls contain the life-lines of the building, they must be structurally strong to withstand lateral loads and provide needed fire protection.

USG Cavity Shaft Wall Systems have been designed and tested using accepted engineering practices with deflection criteria of L/120, L/240, and L/360 clear partition heights. Additionally, limiting height tables listed herein account for flexural and shear forces. A wide range of product and installation combinations is available to meet performance requirements: intermittent air pressure loading of 5, 7½, 10, 15 psf; vertical heights in three stud sizes and four steel thicknesses to accommodate lobbies and mechanical rooms (see Limiting Height Table, page 5). A 2-hr. fire-resistant rating, a common building code requirement, is met with USG Cavity Shaft Walls—UL Design No. U438 and U467. A 2-hr. fire-resistant assembly using DUROCK Interior Cement Board on the finish side is also available—UL Design U459. Up to 4-hour fire-resistance ratings and excellent sound control are offered with modified assemblies (see test data, page 3). Surface burning characteristics for 1" SHEETROCK brand Gypsum Liner Panels are flame spread 20, smoke developed 0. Many assembly details for doors and other penetrations of USG Shaft Walls have been tested for compliance with 2-hr. fire ratings (see pages 6 to 8).

Faster Completion—Earlier Occupancy

USG Cavity Shaft Walls erect easily using components and application procedures familiar to mechanics. Cavity Shaft Walls, because they are erected without adhesives, install faster than other multi-layer gypsum panel systems. All USG Cavity Shaft Wall Systems install from each floor, leaving shaft free of scaffolding. Elevators go in months earlier than with masonry enclosures—ready to move men and materials to floors when they are needed. Jobs move faster, schedules are more easily met and buildings can be occupied sooner.

Economy

USG Cavity Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 9 psf for 2-hour systems to 16 psf for the 4-hour assembly. In high-rise buildings, where masonry shaft enclosures can weigh up to 45 psf, USG Cavity Shaft Walls offer an opportunity for significant savings in structural framing costs.

Sound Control

The standard Cavity Shaft Wall assembly offers 39 STC rating; 47 STC can be obtained by adding 1" THERMAFIBER Sound Attenuation Fire Blankets (SAFB) within the partition cavity and 51 STC with RC-1 Resilient Channels (part of the family of SHEETROCK Metal Products) and 1½" THERMAFIBER SAFB.

Provide Airtight Seal

With SHEETROCK Acoustical Sealant applied to partition perimeter and penetrations, the assemblies resist air pressure surges up to 15 psf (see details). This minimizes whistling and dirt accumulation due to air movement in elevator shafts.

Strong, Rigid Studs

Engineering design has developed the unique C-H Stud, a strong, rigid and highly efficient structural member. The stud flanges provide friction-fit contact along the entire liner panel length to eliminate rattles. When used with J-Runners and gypsum liner panels, the C-H Stud produces a stronger, sturdier wall permitting greater limiting heights compared to competitive systems.

Impact-Resistant

USG Cavity Shaft Walls subjected to impact proved to be rugged and durable. Wall was impacted with a 60-lb. sand bag. In the test, three impacts each were made at 15 ft.-lb., 30 ft.-lb., and each following 15 ft.-lb. interval until failure. At 270 ft.-lb. the test was stopped; while cracked, the wall was not penetrated, thus showing remarkable toughness.

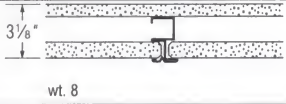
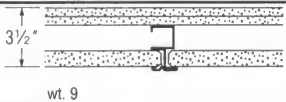
Flexing Resistance Provides Life-Safety

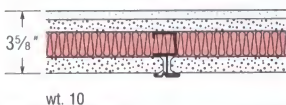
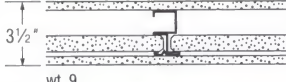
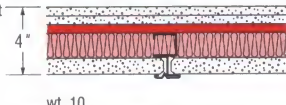
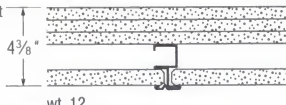
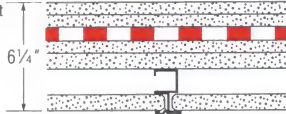
Shaft walls are "working walls." They are subjected to both positive and negative pressures as elevator cabs rise and descend. This piston-effect of elevators in a shaft causes continual flexing in the shaft wall. In tests, USG Cavity Shaft Walls were subjected to over one million full oscillation cycles to check wall performance through the life of the building. These tests showed that a 25-ga. J-Runner is inadequate at the top or bottom of a shaft wall. As the long runner leg is continually flexed from wall deflection, it can rupture and screws strip out and fracture from the flexing. Oscillation tests showed 24-ga. runners minimize these problems and are essential to safety over a long time period.

Limitations

- 1 Non-load bearing.
- 2 Stud and runner thickness, stud spacing, air pressure loading and maximum flexural stress shown in the Technical Data tables should not be exceeded.
- 3 Elevator door operating equipment must be independently mounted.
- 4 Exposure to excessive or continuous moisture and temperatures exceeding 125°F (52°C) must be avoided.

Test Data

Fire rating	Fire-rated construction		Acoustical performance	System reference
	Detail & physical data	Description & test no.	STC	Description & test no.
1 hr.	 wt. 8	Cavity Shaft Wall Gypsum Drywall—¾" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin—fire rating also applies with IMPERIAL FIRECODE C base and veneer finish surface— UL Des U469	N/A	A
2 hr.	 wt. 9	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand liner panels set betw USG steel 25-ga. C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface or THERMAFIBER in cavity—fire-tested both sides— UL Des U438	39 47	USG-750302 Based on 1" THERMAFIBER SAFB— BBN-750706 B

2 hr.		Cavity Shaft Wall Cement Board/Gypsum Drywall—1/2" DUROCK interior cement board—1/2" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20 ga. min C-H studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 1/2" DUROCK steel screws & laminated to gypsum panel with 4" strip DURABOND ceramic tile mastic applied with 3/4" notched trowel midway betw studs—joints fin— UL Des U459*	N/A	N/A	C
2 hr.		Cavity Shaft Wall Gypsum Drywall—1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface—fire-tested both sides— UL Des U467	N/A		D
2 hr. est		Cavity Shaft Wall Gypsum Drywall—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG 25-ga. steel C-H studs 24" o.c.—RC-1 chan spaced 24" o.c.—1 1/2" THERMAFIBER SAFB—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin—est. fire rating based on U of C 2-8-72 and U of C 6-23-75—rating also applies with IMPERIAL FIRECODE C base and veneer finish	51	BBN-750412	E
3 hr. est		Cavity Shaft Wall Gypsum Drywall—3 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer apply horiz—joints fin—est. fire rating based on U of C 2-16-72—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		F
4 hr. est		Cavity Shaft Wall Gypsum Drywall—2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, face side—1" SHEETROCK brand gypsum liner panels set betw USG steel C-H studs 24" o.c.—1" liner panels & 3/8" gypsum panel core screw att to studs—horiz met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin—est. fire rating based on U of C 5-24-74—rating also applies with IMPERIAL FIRECODE C base and veneer finish surface	N/A		G

*Use L/360 deflection criteria for limiting height/stud selection. Refer to SA-932 DUROCK Interior Cement Board Systems for more information on cement board and related products.

Sound Transmission Loss—db

System reference (p.3)	Test no.	Band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
E	BBN-750412	27	30	38	42	47	50	53	54	55	57	57	58	59	56	55	58	51
B	BBN-750706	24	26	36	40	44	46	48	50	52	53	54	54	55	54	50	52	47
B	USG-750302	20	22	25	33	32	35	36	39	41	43	43	45	41	40	43	46	39

Elevator Shaft Pressures

The air pressure load on shaft walls depends upon the elevator cab speed and the number of elevators per shaft. The following recommendations are derived from United States Gypsum Company tests conducted in three high-rise buildings up to 17 stories.

Recommended Elevator Shaft Pressure Load

Elevator velocity ft./min.	One or two elevators per shaft	Three or more elevators per shaft
0 to 180	5.0 psf	5.0 psf
180 to 1,000	7.5 psf	5.0 psf
1,000 to 1,800	10.0 psf	7.5 psf
1,800 to 3,000	15.0 psf	7.5 psf

Limiting Heights

Maximum partition heights are shown for four different intermittent air pressure loads and three allowable deflections. The applied pressure load is selected by the designer based on elevator cab speed and the number of elevators per shaft. Instead of using only deflection criteria, United States Gypsum Company design data considers several additional factors in determining limiting partition heights.

- Bending stress**—the unit force exerted which will break or distort the stud.
- End reaction shear**—determined by the amount of force applied to the stud which will bend or shear the J-Runner or cripple the stud.
- Deflection**—the actual deflection under a load. Allowable deflection is based on the amount of bending under load that a particular wall can experience and still perform its function with safety.

Thickness—Steel Components⁽¹⁾

Style	Design ⁽²⁾		Minimum	
	in	mm	in	mm
CH, ES 25	0.0188	0.48	0.0179	0.45
JR 24	0.0239	0.61	0.0227	0.58
CH 22	0.0310	0.79	0.0294	0.75
ES, JR, JS, CH 20	0.0359	0.91	0.0341	0.87

(1) Uncoated steel thickness; meets ASTM A568. Studs and runners meet ASTM C645. Base metal meets ASTM A446 standards for structural performance. Coatings are galvanized per ASTM A525; aluminumized per ASTM A463, or aluminum-zinc per ASTM A792. (2) Conforms to AISI Specification for the Design of Cold-Formed Steel Structural Members, 1986 edition.

Structural Properties—Steel Components

Component & size	Stud designation	Avg. weight (lb/lin ft)	Area (in ²)	I _x (in ⁴)	S _x [*] (in ³)	Allow. design stress (ksi)
2 1/2" C-H stud	212CH25	0.5186	0.1524	0.129	0.093	19.8
	212CH22	0.861	—	0.208	0.1519	24.0
	212CH20	0.998	—	0.239	0.1741	24.0
4" C-H stud	400CH25	0.6118	0.1798	0.383	0.162	19.8
	400CH20	1.243	—	0.730	0.318	24.0
double 6" E-Stud	600ES25	1.546	0.3982	2.004	0.628	20.00
	600ES20	2.372	0.0840	3.400	1.094	20.00
2 1/2" J-Runner	212JR24	0.448	—	0.117	0.085	3.00
	212JR20	0.670	—	0.192	0.130	4.96
4" J-Runner	400JR24	0.573	—	0.351	0.163	3.00
	400JR20	0.857	—	0.574	0.251	4.96
6" J-Runner	600JR24	0.740	—	0.937	0.295	3.00
	600JR20	1.107	—	1.523	0.457	4.96
2 1/2" Jamb Strut	212JS20	0.818	—	0.226	0.143	3.00
4" Jamb Strut	400JS20	1.006	—	0.647	0.270	3.00
6" Jamb Strut	600JS20	1.256	—	1.673	0.485	3.00

*Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33%.

Section Properties—UNIMAST Metal Furring Channel

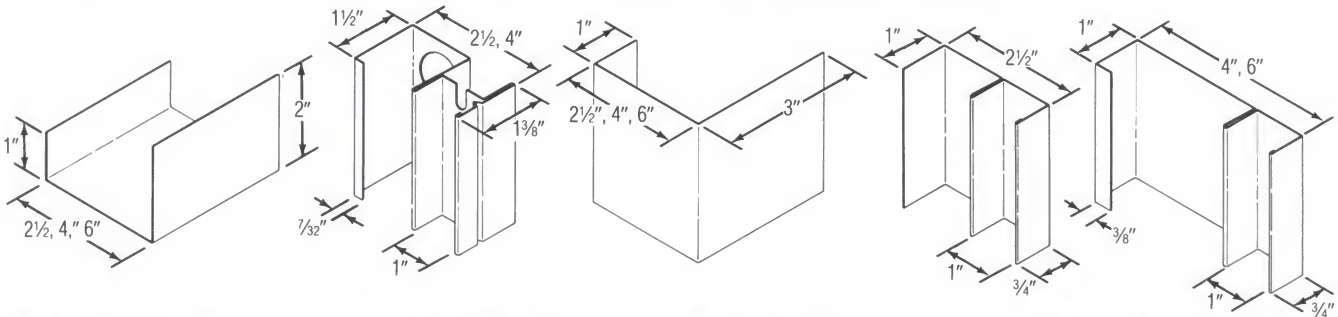
Item	Gauge	Depth	Steel thick. in. *	I _x in ⁴	S _x in ³	F _c ksi
DWC-25	25	3/8"	.0188	.0096	.0247	13.9
DWC-20	20	3/8"	.0344	.0165	.0355	18.8

*Base steel design thickness.

Limiting Heights⁽¹⁾—Shaft Walls

Stud type & size	Designation	Stud spcg.	Allow. defl.	Intermittent air pressure load (wind load)—psf											
				Fire-rated system B, C, D, E, F, G				Fire rated system D ⁽²⁾				Fire rated system A ⁽³⁾			
				5	7.5	10	15	5	7.5	10	15	5	7.5	10	15
2½" C-H Studs	212CH25	24"	L/120	12'10"(f)	10'5"(f)	9'0"(f)	7'5"(f)	12'3"(d)	10'5"(f)	9'0"(d)*	6'0"(v)*	12'10"(f)	10'5"(f)	9'0"(f)*	7'5"(f)
			L/240	12'1"(d)	10'5"(f)	9'0"(f)	7'5"(f)	9'9"(d)	8'6"(d)	7'9"(d)*	6'0"(v)*	11'8"(d)	10'2"(d)	9'0"(d)	7'5"(f)
			L/360	10'7"(d)	9'3"(d)	8'5"(d)	7'4"(d)	8'6"(d)	7'5"(d)	6'9"(d)	5'11"(d)	10'2"(d)	8'11"(d)	8'0"(d)	7'1"(d)
	212CH22	24"	L/120	18'0"(f)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)	17'2"(d)	14'8"(f)	12'9"(f)	10'5"(f)
			L/240	14'11"(d)	13'0"(d)	11'10"(d)	10'4"(d)	13'7"(d)	11'11"(d)	10'10"(d)	9'5"(d)	13'7"(d)	12'11"(d)	10'10"(d)	9'5"(d)
			L/360	13'0"(d)	11'5"(d)	10'4"(d)	9'0"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)	11'11"(d)	10'5"(d)	9'5"(d)	8'3"(d)
	212CH20	24"	L/120	19'2"(d)	15'9"(f)	13'8"(f)	11'2"(f)	17'7"(d)	15'5"(d)	13'8"(f)	11'2"(f)	17'7"(d)	15'4"(d)	13'8"(f)	11'2"(f)
			L/240	15'3"(d)	13'4"(d)	12'1"(d)	10'7"(d)	14'0"(d)	12'3"(d)	11'1"(d)	9'8"(d)	14'0"(d)	12'2"(d)	11'1"(d)	9'8"(d)
			L/360	13'4"(d)	11'7"(d)	10'7"(d)	9'3"(d)	12'3"(d)	10'8"(d)	9'0"(d)	8'6"(d)	12'2"(d)	10'8"(d)	9'8"(d)	8'6"(d)
4" C-H Studs	400CH25	24"	L/120	16'11"(f)	13'10"(f)	11'11"(f)	9'8"(v)*	16'10"(f)	13'9"(f)*	10'4"(v)*	6'11"(v)*	16'10"(f)	13'9"(f)	10'4"(v)*	6'11"(v)*
			L/240	16'11"(f)	13'10"(f)	11'11"(f)	9'8"(v)*	16'3"(d)	13'9"(f)*	10'4"(v)*	6'11"(v)*	15'10"(d)	13'4"(d)	10'4"(v)*	6'11"(v)*
			L/360	14'3"(d)	12'5"(d)	11'11"(f)	9'8"(v)*	14'3"(d)	12'5"(d)	10'4"(v)	6'11"(v)*	13'4"(d)	11'8"(d)	10'4"(v)*	6'11"(v)*
	400CH20	24"	L/120	22'10"(d)	20'0"(d)	18'2"(d)	15'0"(f)*	23'7"(d)	20'7"(d)	18'5"(f)	15'0"(f)*	22'0"(d)	19'3"(d)	17'6"(d)*	15'0"(f)*
			L/240	18'2"(d)	15'10"(d)	14'5"(d)	12'7"(d)	18'9"(d)	16'4"(d)	14'10"(d)	13'0"(d)	17'6"(d)	15'3"(d)	13'11"(d)	12'2"(d)*
			L/360	15'10"(d)	13'10"(d)	12'7"(d)	11'0"(d)	16'4"(d)	14'3"(d)	13'0"(d)	11'4"(d)	15'3"(d)	13'4"(d)	12'2"(d)	10'7"(d)*
Double 6" E-Studs	600ES25	24"	L/120	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)
			L/240	26'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'6"(d)	18'9"(v)	14'0"(v)	9'3"(v)	25'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)
			L/360	23'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)	22'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)
	600ES20	24"	L/120	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*	28'0"(c)	28'0"(c)*	28'0"(c)*	20'0"(v)*
			L/240	28'0"(c)	26'3"(d)*	24'0"(d)*	20'0"(v)*	28'0"(c)	26'0"(d)*	23'6"(d)*	20'0"(v)*	28'0"(c)	24'9"(d)	22'6"(d)*	20'0"(v)*
			L/360	26'3"(d)	23'0"(d)	21'0"(d)*	18'3"(d)*	26'3"(d)	22'9"(d)	20'6"(d)*	18'0"(d)*	25'3"(d)	21'9"(d)	19'6"(d)	17'3"(d)*

(1) Table heights also apply to sustained pressures (max. 10 psf) equal to ⅓ of intermittent pressures shown. (2) For assembly with single-layer board both sides of studs. (3) For assembly with single-layer board attached to studs. Limiting criteria: f—bending stress, d—deflection, v—end reaction shear, c—practical limitation. **IMPORTANT:** Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c. *Use JR20 runner for heights with asterisk. See page 3 for system references and rated assembly details.



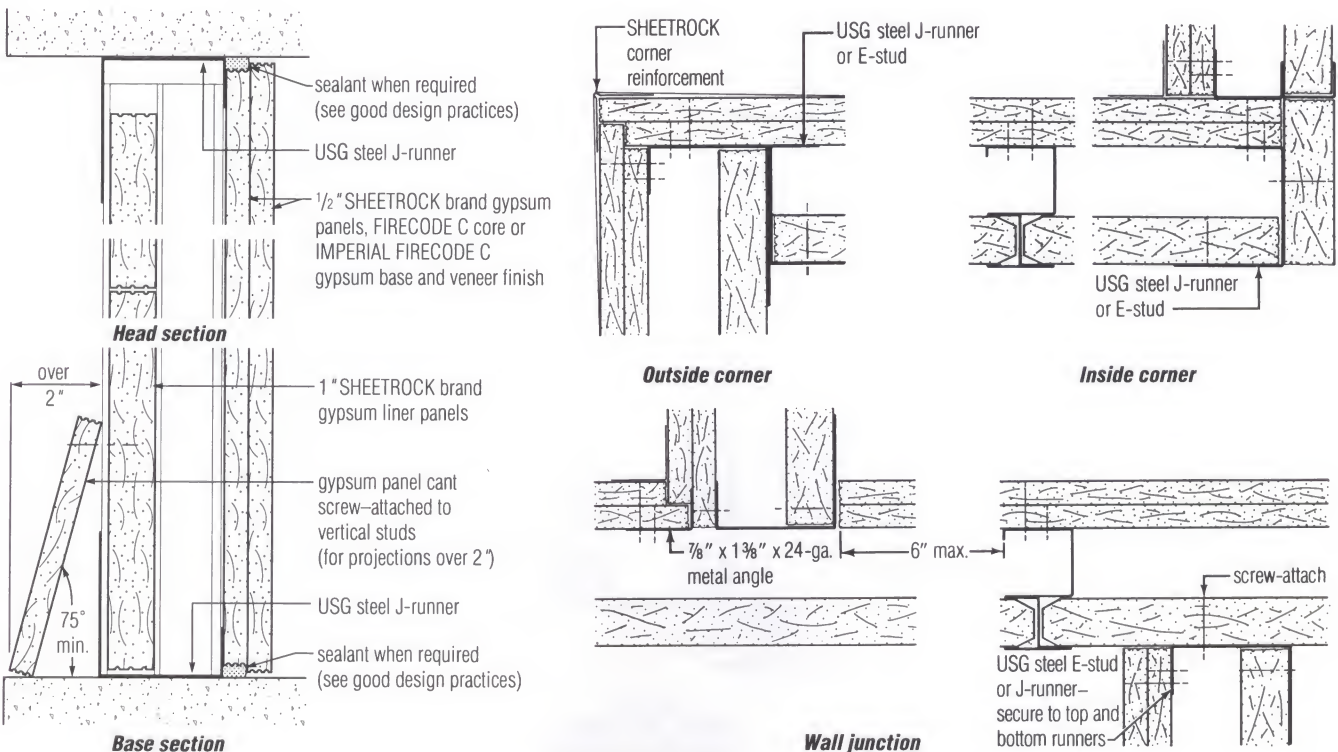
USG Steel J-Runner (JR)

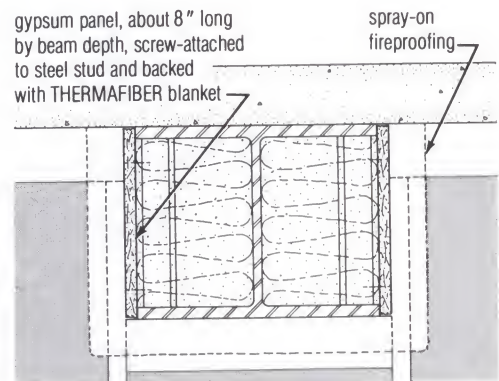
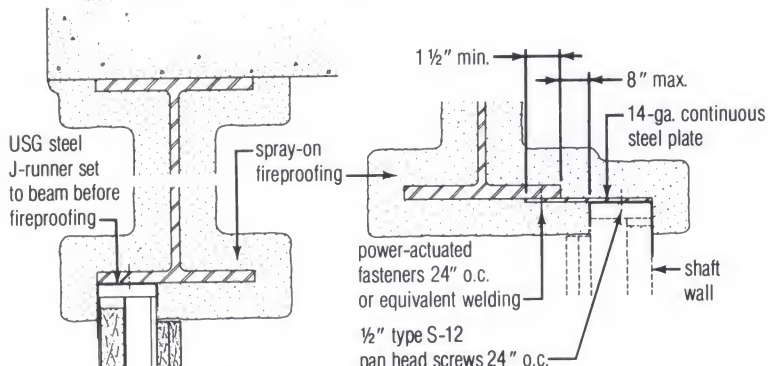
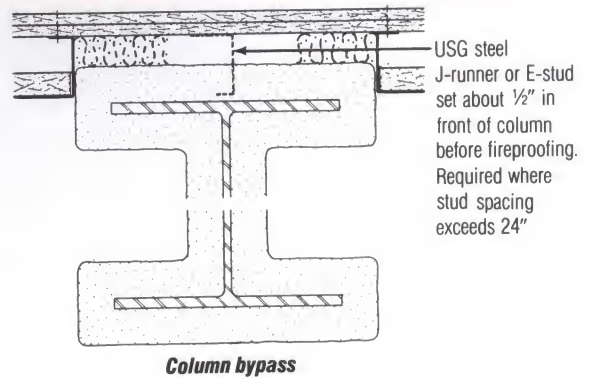
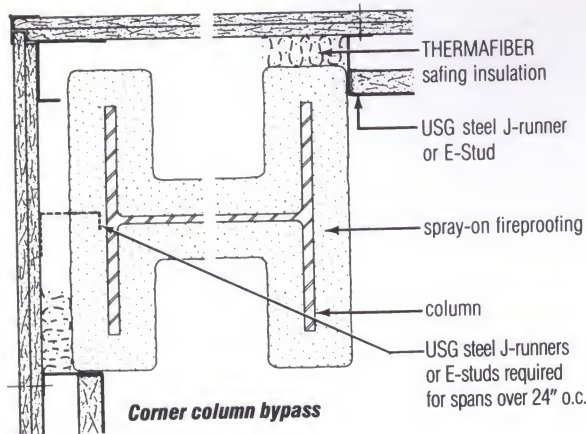
USG Steel C-H Stud (CH)

Steel Jamb-Strut

USG Steel E-Stud (ES)

Details



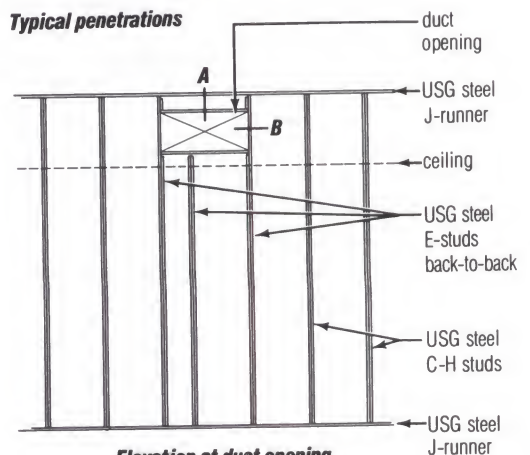


**Steel beam
(2-hr. beam/
2-hr. partition—
see specifications)**

**Steel beam
offset wall**

Elevation at boxed beam

Typical penetrations

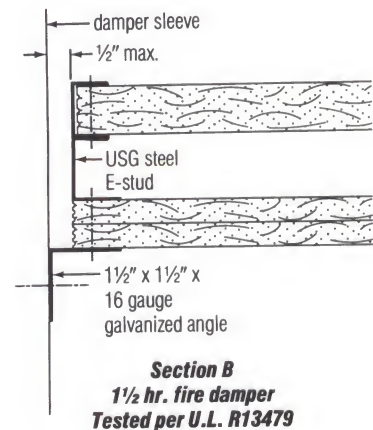
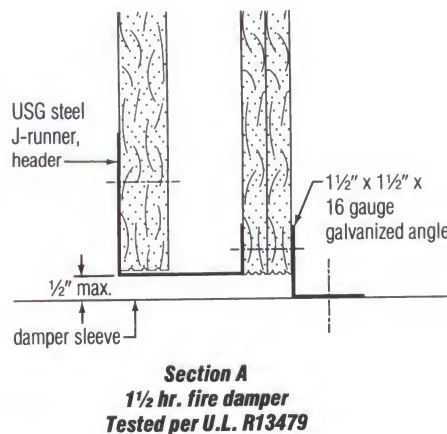
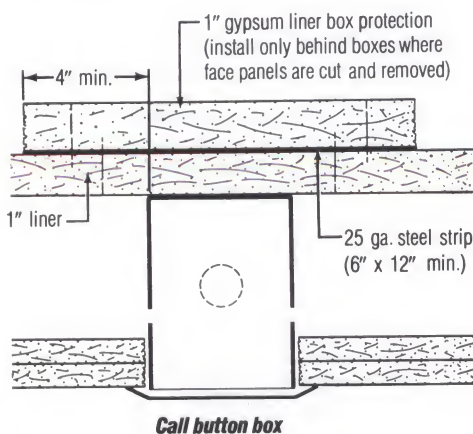


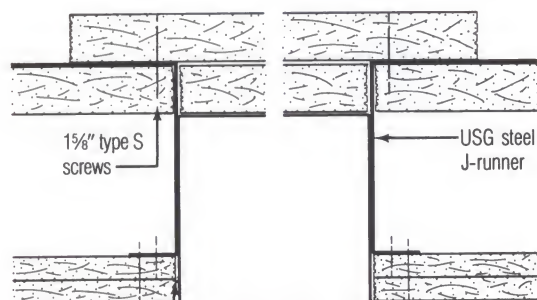
Penetration Fire Tests

To maintain the integrity of the shaft wall, most services that interrupt the wall must have additional protection against fire. Call-button and floor-indicator penetrations occur in every elevator shaft wall. Boxes for these services usually penetrate the wall and invalidate the fire rating unless supplementary fire protection is added. Details included here successfully achieved a 2-hour fire endurance when tested according to ASTM E119 fire exposure.

Electrical Box: Box size should be compatible with C-H stud size selected (4" studs typically required) per Test CEG 6-15-79.

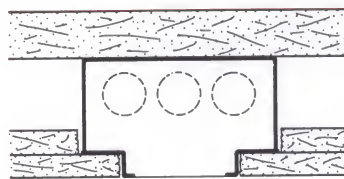
Fire Damper: 1½ hour per Test UL R13479.



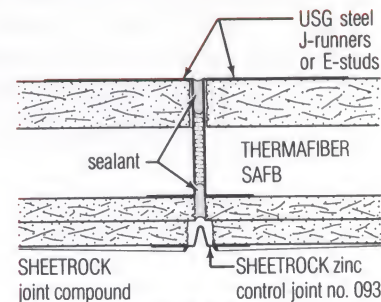


caulk when required
-see specifications

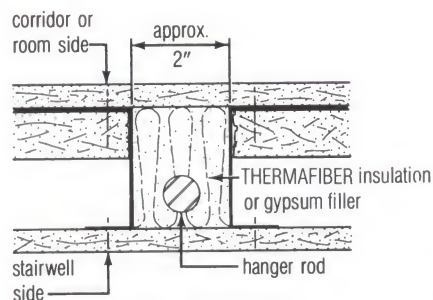
Mail chute



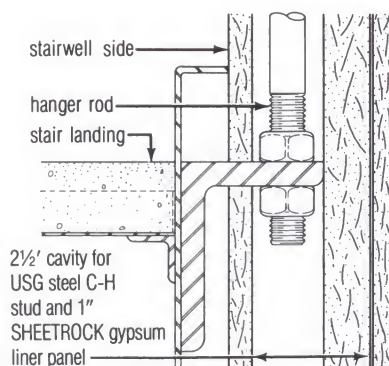
Outlet box



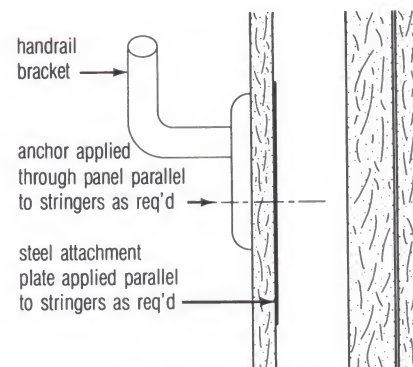
Control joint



Cross section at stair hanger



Stair hanger rod application



Handrail application

Air Handling Systems

Gypsum shaft walls have been used for many years to house all types of ducts in the shaft area. Their fire-resistant features plus economical dry construction make them ideal for this use. Today shaft walls are used successfully without a metal liner for handling return air in HVAC systems. To function properly, shaft wall systems should be designed with the following performance provisions.

- 1 Gypsum board surface temperature does not exceed 125°F.
- 2 Air stream dew point temperatures are maintained below gypsum board surface temperature.
- 3 The assembly is constructed to withstand sustained design uniform air pressure loads not exceeding 10 psf. Start up surge loads should not be greater than 1½ times the design static load. (See table at right for limiting heights).
- 4 Separate approved liners should be installed in areas subject to continuous moisture overspray, condensation or air stream temperature over 125°F.
- 5 To insure airtight construction, select appropriate sealants and apply where required.

Limiting Heights—Unlined Return Air Shafts

Stud type & size	Designation	Stud spcg.	Allow. defl.	Sustained pressure load-psf			
				2-hr. fire-rated system		1-hr. fire rated system	
				5	10	5	10
2½" C-H Studs	212CH25	24"	L/120	10'5"	7'5"	10'5"	6'0"
			L/240	10'5"	7'5"	8'6"	6'0"
			L/360	9'3"	7'5"	7'5"	5'11"
	212CH22	24"	L/120	14'8"	10'5"	14'8"	10'5"
			L/240	13'0"	10'4"	11'11"	9'5"
			L/360	11'5"	9'0"	10'5"	8'3"
4" CH Studs	212CH20	24"	L/120	15'9"	11'2"	15'4"	11'2"
			L/240	13'4"	10'7"	12'2"	9'8"
			L/360	11'7"	9'3"	10'8"	8'3"
	400CH25	24"	L/120	13'10"	9'8"	13'9"	6'11"
			L/240	13'10"	9'8"	13'4"	6'11"
			L/360	12'5"	9'8"	11'8"	6'11"
Double 6" E-Studs	400CH20	24"	L/120	20'0"	15'0"	19'3"	15'0"
			L/240	15'10"	12'7"	15'3"	12'2"
			L/360	13'10"	11'0"	13'4"	10'7"
	600ES25	24"	L/120	18'9"	9'3"	18'9"	9'3"
			L/240	18'9"	9'3"	18'9"	9'3"
			L/360	18'9"	9'3"	18'9"	9'3"
Double 6" E-Studs	600ES20	24"	L/120	28'0"	20'0"	28'0"	20'0"
			L/240	26'3"	20'0"	24'9"	20'0"
			L/360	23'0"	18'3"	21'9"	17'3"

Important: Runner fasteners should withstand 193 lb. single shear and 200 lb. bearing force; attachment spacing should not exceed 24" o.c.

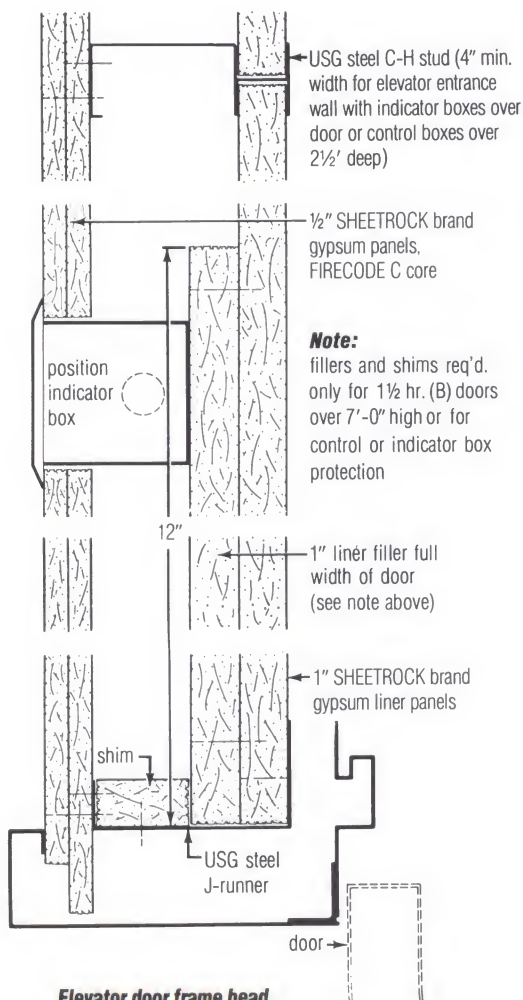
*Use JR20 runner for heights with asterisk.

Elevator Door and Frame Assemblies

Typically, for buildings of four stories or more, building codes require a 1½-hour "B" rating for elevator entranceways in a 2-hour rated shaft wall. Certain firms have conducted fire tests with their door and frame assemblies in USG Cavity Shaft Walls—UL Design U438 rated 2-hours. These door assemblies comply with the safety code for elevators and dumbwaiters ANSI A17.1 and have been tested per ASTM E152. Specific door jamb studs, jamb struts and installation methods are required for fire-rated construction. See entrance manufacturer for details. When specifying door frame assemblies, also specify installation in the shaft wall in which assemblies were performance-tested.

There have been many successful UL tests on door assemblies in USG Cavity Shaft Walls, some are shown at right. In every successful test, the interface between the entranceway and shaft wall was constructed with a 20-ga. jamb strut having a 3-in. leg, installed at the door jamb (see details).

Both the 20-ga. thickness and the 3-in. leg length in the jamb strut are required to achieve tested performance.



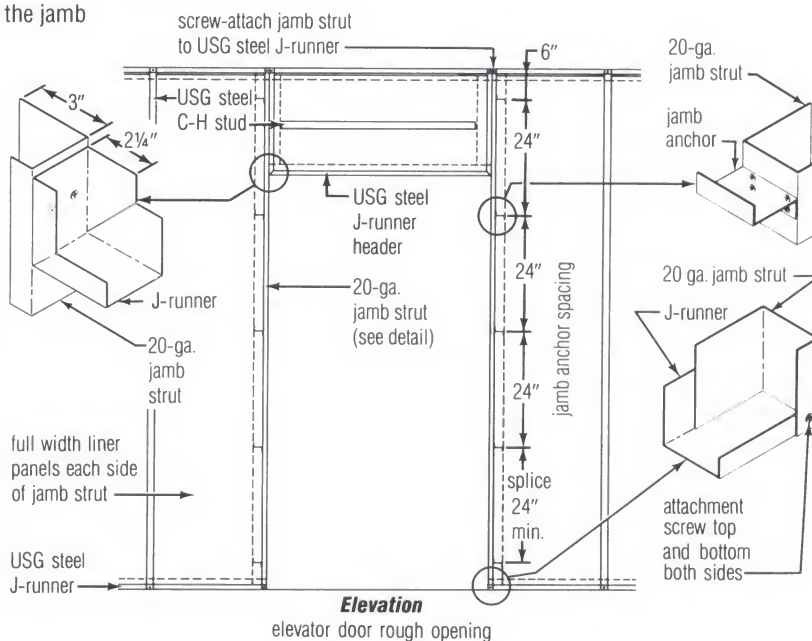
Elevator door frame head, jamb similar

Note: Doors and operating accessories to be hung or supported separately.

Shaft Wall Entranceway Assemblies—1½-hr. Fire Rated

Manufacturer	Maximum opening size	Door type	UL file no.
Otis	42"x84"	center opening	R7416
Otis	48"x100½"	two-speed slide	R7416
Otis	48"x102"	center opening	R7416
Westinghouse	48"x102"	center opening	R8176
Dover	42"x96"	single slide	R6155
Dover	48"x96"	center opening	R6155
Tyler	42"x102"	single slide	R6403
Tyler	60"x108"	center opening	R6403
D A Matot	48"x78"	dumbwaiter	R6748
Hauenstein & Burmeister	48"x108"	center opening	R4153
Courion Industries	48"x84"	dumbwaiter	R2317
General Elevator	48"x84"	center opening	R10483
Columbia	42"x108"	single slide	R9642
Columbia	48"x108"	center opening	R9642

Note: Entranceways tested with UL Design U438 shaft wall and achieved a 1½-hour "B" rating. Apparent duplications are a result of tests involving different types or styles of either frames or doors.



Horizontal Shaft-Wall Assemblies

USG Cavity Shaft Walls installed horizontally provide economical construction for fire-resistive duct protection, corridor and other ceilings and stairway soffits. Also ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above. With 1" liner panels inserted in C-H Studs 24" o.c. and triple-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the system provides greater spans and 2-hr. protection from fire either inside or outside the duct. **Test No.: WHI-495 PSH 0154/0167.**

With double-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core, screw-attached to studs, the assembly provides suitable 2-hour fire-resistive ceiling construction for corridors and stairs (see details).

One-hour fire-rated construction is offered with single-layer ½" SHEETROCK brand Gypsum Panels, FIRECODE C Core.

Limitations

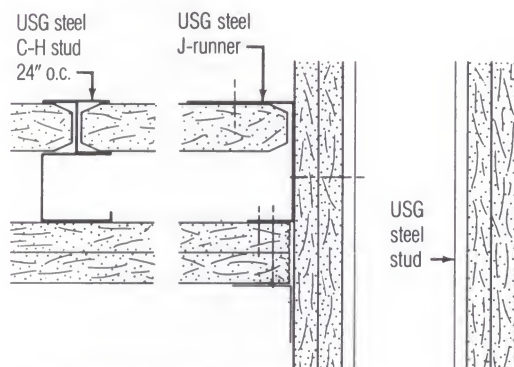
- 1 USG C-H Studs are not designed to carry live loads or mechanical equipment or provide material storage area.
- 2 Maximum stud spacing is 24" o.c.; maximum spans are shown in table below.

Limiting Spans—Horizontal Shaft Walls⁽¹⁾

Stud style	Single-layer ½" gypsum panels ⁽²⁾	Double-layer ½" gypsum panels ⁽²⁾	Triple-layer ½" gypsum panels ⁽³⁾
212CH25	6'7"	6'0"	6'5"
212CH22	9'4"	8'6"	7'11"
212CH20	10'3"	9'2"	8'3"
400CH25	8'8"	7'10"	8'6"
400CH20	14'6"	13'2"	12'0"

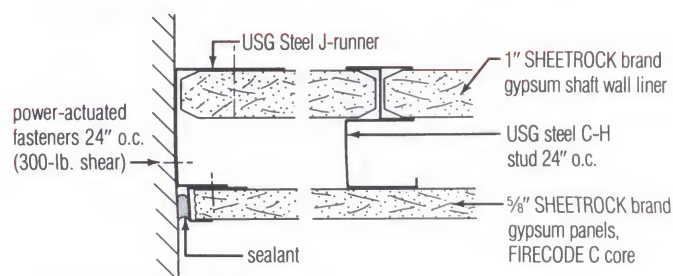
(1) Based on L/240 allowable deflection and JR24 runner. (2) Allowable steel stress reduced 50%.
(3) Full steel stress allowed based on ASTM E119.

2-Hr. fire rated assembly
(see NER 258)



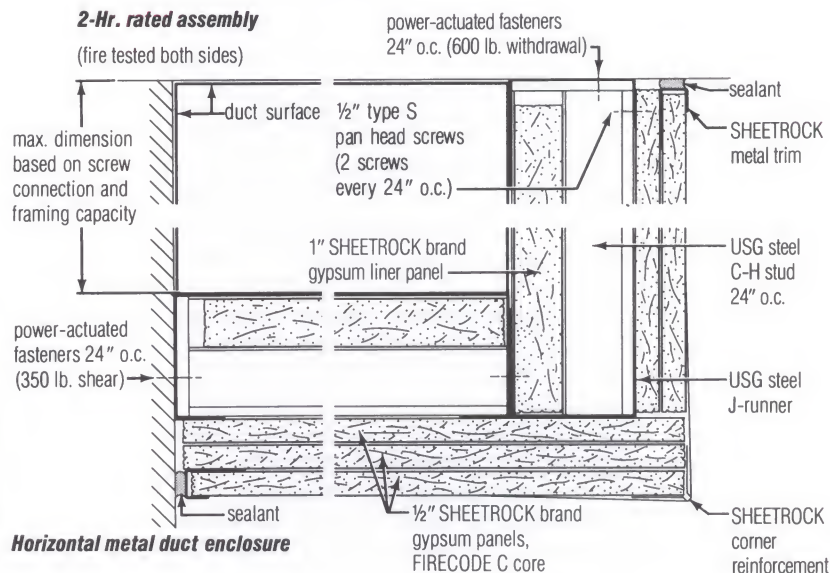
Corridor ceiling and stair soffit

1-Hr. fire rated assembly
(see NER 258)



Corridor ceiling and stair soffit

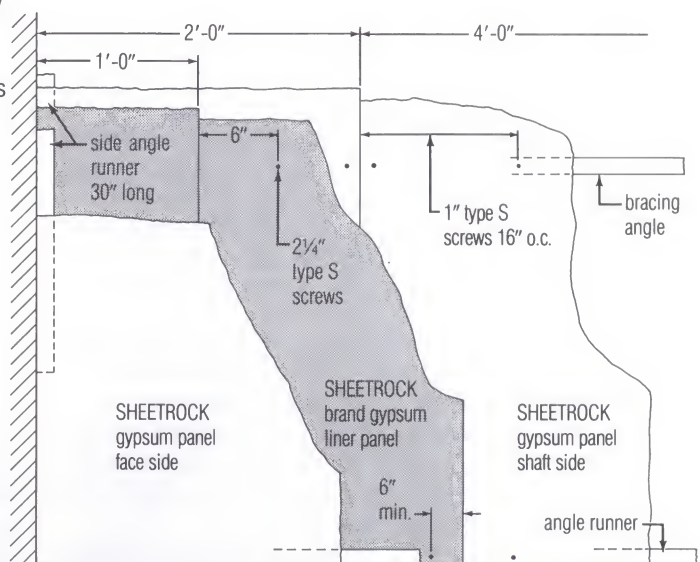
2-Hr. rated assembly
(fire tested both sides)



Horizontal metal duct enclosure

Vent Shaft Enclosure

USG Vent Shaft System provides a vent enclosure for vertical shafts in apartments and other types of multi-story buildings. The 2-hr. fire rating meets UL Design U505. This shaft assembly is particularly suited for structures having a number of relatively small and widely separated mechanical, service and ventilator shafts. For vent shaft runs 4' or less, the horizontal bracing angle may be omitted. The liner may be installed to the angle runners with double facing layers of 5/8" FIRECODE Core Panels (CEG 6-26-89).



Vent shaft elevation

Good Design Practices

- 1 System Performance**—United States Gypsum Company will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on Company products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following substitution of materials or compromise in assembly design cannot be certified; failure may result under critical conditions.
- 2 Control Joints**—Shaft wall surfaces should be isolated with control joints or other means where: **(a)** construction changes within the plane of the shaft wall; **(b)** shaft wall run exceeds 30'. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.
- 3 Penetrations** of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 48" wide require supplemental support for the shaft wall at the opening. Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.
- 4 Pressure Loads**—Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 15 psf are expected, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Shaft walls may be used for air handling with sustained pressures up to 10 psf. Sealant selection including joint treatment, surface coatings and details to seal the wall under these sustained pressures must be provided by the designer. When air pressure exceeds 10 psf, the air handling should be contained with a metal duct.
- 5 Screws**—Type S Screws are suitable for gypsum panel or gypsum base attachment to 25, 22 and 20-ga. steel studs. Type S-12 screws should be specified for other applications to steel heavier than 20-ga. Screw lengths should be 1" for base layer and 1½" for face layer and at least ¾" longer than the total thickness for other applications.
- 6 Steel Frame Construction**—Runners and studs attached to beams and columns should be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner and sealant.
- 7 Steel door frames**, ordered separately, should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of the shaft wall plus ½" minimum. They should be anchored at floor with 16-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchors should be 18-ga. steel welded in jamb and screw-attached to struts.
- All one-piece frames should be spot-grouted after shaft wall liner is installed. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound just before inserting face layer into frame. If necessary, cut out board to provide relief at jamb anchor. Do not terminate panels against trim return. Provide bracing where required by installing diagonal bracing from jamb strut-studs to structure.
- 8 Height**—Where cavity shaft wall height exceeds max. available panel height, liner panel end joints should be positioned within the upper and lower third-points of wall. Joints may be butted

together or reinforced with horizontal C-H stud or USG H-spline cut to fit between adjacent vertical studs. Walls over 16' high should have studs screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.

- 9 Stud and Runner Selector**—Size and gauge should be based on design load, allowable deflection and end reaction/bending stress.
- 10 Electric Boxes**—Cavity shaft walls will accommodate outlet boxes with depths up to the stud width.
- 11 Standards**—The following standards apply:
- ASTM C-36—Standard Specification for Gypsum Board.
 - ASTM A-446—Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
 - ASTM C-475—Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction.
 - ASTM A-525—Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - ASTM C-645—Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
 - ASTM C-754—Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board, Backing Board, or Water-Resistant Backing Board.
 - ASTM C-840—Standard Specification for Application and Finishing of Gypsum Board.
 - ASTM C-1002—Standard Specification for Steel Drill Screws for the Application of Gypsum Board.
 - ASTM C-1047—Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- 12 Additional Information**—See technical folders in this series: *Construction Selector SA-100* for fire and sound-rated systems; *Gypsum Panels Folder SA-927* for shaft wall components and joint system specifications; *Plaster Products, Systems and Accessories SA-920* for lath and plaster specifications; and *Texture and Finish Products Folder SA-933* for finishing product specifications.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed instructions.

The UNIMAST products identified in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Submittals

Submit certification of compliance with fire and sound requirements indicated. Fire rating compliance shall include verification of compatibility with labelled elevator door frame installation and test verification of call box and similar penetrations. Provide additional certification as follows:

1. Fire test verification of damper penetration acceptability.
2. Fire test verification of horizontal Shaft Wall installation.
3. Test verification of fatigue failure resistance through 1,000,000 cycles at a pressure of 7.5 psf and at a maximum deflection of L/240.
4. Samples of studs that exhibit continuous edge support of liner panels.
5. Code compliance documentation.

1.5 Environmental Conditions

- A** In cold weather during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.
- B** For gypsum base and veneer finish application, SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound and SHEETROCK Joint Tape shall be used on all joints and internal corners and allowed to set thoroughly before plaster application.

1.6 Protection

All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

Part 2: Products

2.1 Materials

- A** Liner Board—1" SHEETROCK brand Gypsum Liner Panels, beveled edge, 24" wide, lengths as required. Identified with UL Classification label.
- B** Faceboards—(1/2") (3/8") thick, 48" wide, tapered edge, SHEETROCK brand Gypsum Panels, (SW Edge) (FIRECODE Core) (FIRECODE C Core), lengths as required. Identified with UL Classification label.
- C** Gypsum Base—(1/2") (3/8") thick, 48" wide, square-edge IMPERIAL FIRECODE C Gypsum Base, lengths as required.
- D** Joint Treatment—(select a United States Gypsum Company Joint System).
- E** Fasteners—Screws: (3/8") (1/2") Type (S) (S-12) pan head; 3/8" Type S-12 low profile head; (1") (1 1/8") (2 1/4") Type S bugle head. DUROCK Steel Screws: 1 3/8".
- F** SHEETROCK Metal Trim—No. (200A) (200B) (401) (402) (701B) (801B).
- G** SHEETROCK Corner Bead—(DUR-A-BEAD) (No. 800) (No. 900).
- H** UNIMAST Metal Furring Channels.
- I** RC-1 Resilient Channels.
- J** USG Steel C-H Studs, (212CH25) (212CH22) (212CH20) (400CH25) (400CH20) hot-dipped galvanized, lengths as required (select from tables).
- K** USG Steel E-Studs, (212ES25) (212ES20) (400ES25) (400ES20) (600ES25) (600ES20) hot-dipped galvanized, lengths as required (select from tables).
- L** USG Steel J-Runners, (212JR24) (400JR24) (600JR24) (212JR20) (400JR20) (600JR20) hot-dipped galvanized, for USG Steel C-H and E-Studs.
- M** Steel Jamb Struts, (212JS20) (400JS20) (600JS20) hot-dipped galvanized (for elevator door framing).
- N** Runner Fasteners, power-driven type, to withstand 193 lb. single shear and 200 lb. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (obtain locally).
- O** SHEETROCK Acoustical Sealant.
- P** THERMAFIBER Sound Attenuation Fire Blankets—(1") (1 1/2") 24"x48".
- Q** SHEETROCK Zinc Control Joint 093.
- R** Cement Board—DUROCK Interior Cement Board, 1/2" thickness, 36" width x (48") (60") (72") length.

Part 3: Execution

3.1 Cavity Shaft Wall Erection

A Studs and Liner Panels—Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and max. 24" o.c. With steel frame construction, install floor and ceiling runners and J-Runners or E-Studs on columns and beams before steel is fireproofed. Remove spray-fireproofing from runners and E-Studs before installing gypsum liner panels (2-hour steel fireproofing). For other structural steel fireproofing requirements, use Z-shaped stand-off clips secured to structural steel before fireproofing application.

Cut liner panels 1" less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed max. available panel height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels. Screw studs to runners on walls over 16'

Use steel C-H studs 3/8" to not more than 1/2" less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jambs, and columns. Install full-length E-Studs over gypsum liner panels both sides of closure panels. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling steel J-Runners or E-Studs each side of steel hinged door frames and jamb struts each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two 3/8" Type S-12 pan head screws. Attach strut-studs to jamb anchors with 1/2" Type S-12 screws. Over steel doors, install a cut-to-length section of J-Runner and attach to strut-studs with 3/8" Type S-12 screws.

B Resilient Channels—Install RC-1 Resilient Channels horizontally to face of studs, within 6" of floor and ceiling and max. 24" o.c. Attach channels to studs with 3/8" Type S screws driven through holes in mounting flange. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice. Install 1/2" x 3" wide continuous gypsum filler strips to top and bottom runner.

For resiliently attached finish, apply base layer horizontally to resilient channels with end joints staggered; fasten with 1" Type S screws 12" o.c. Apply face layer vertically with joints staggered; attach to channels with 1 3/8" Type S screws 12" o.c.

C Gypsum Panels—Single layer one side, one hour: apply 3/8" SHEETROCK brand Gypsum Panels, FIRECODE C Core, on corridor side. Position gypsum panel vertically and fasten to studs and runners with 1" Type S Screws 12" o.c.

Double layer one side, two hour: apply base layer vertically to studs with 1" Type S screws 24" o.c. along edges and in the field of the panels. (Apply face layer vertically and fasten to studs and J-Runners with 1 3/8" Type S screws 12" along the edges and in the field, staggered from screws in base layer. Joints between base and face layers staggered.) (Apply face layer horizontally and attach over base layer with 1 3/8" type S screws 12" o.c. in the field, along the vertical edges and to the floor and ceiling runners. Face layer attached to base layer with 1 1/2" long Type G screws midway between studs and 1" from the horizontal joint.)

Single layer both sides, two hour: apply gypsum panels vertically to both sides of studs. Fasten gypsum panels with 1" Type S screws 12" o.c. along the vertical edges and in the field.

Double layer, two hour with DUROCK Cement Board: install 1 1/2" THERMAFIBER SAFB in stud cavity. Apply base layer of 3/8" SHEETROCK brand Gypsum Panels, FIRECODE Core, vertically and

attach with 1" Type S screws 24" o.c. along vertical edges and in the field. Install face layer of ½" DUROCK Cement Board by lamination to gypsum panels with 4" wide strip of mastic applied with ¾" notched trowel midway between studs and fasten to studs with 1½" DUROCK Screws 6" o.c.

Double layer, two hour resilient: apply base layer to resilient channels with end joints staggered; fasten with 1" Type S screws 12" o.c. Apply face layer vertically with joints staggered; fasten to channels with 1½" Type S screws 12" o.c.

Triple layer, three hour: install three layers of SHEETROCK brand Gypsum Panels, FIRECODE Core, vertically on corridor side of studs. Fasten base layer with 1" Type S screws 24" o.c. along vertical edges and in the field; mid-layer horizontally with joints staggered with 1½" Type S screws 24" o.c. along vertical edges and in the field; face layer vertically with joints staggered and fastened with 2¼" Type S screws 16" o.c. Attach face layer to J-Runners with 2¼" Type S screws 12" o.c.

Horizontal installation, two hour: install three layers of ½" SHEETROCK brand Gypsum Panels, FIRECODE Core, to horizontally installed CH and/or E-Studs. Install the base layer with the edges parallel to the studs and attached with 1" Type S screws 24" o.c.; the mid layer in the same manner with joints offset 2' and attached with 1½" Type S screws 24" o.c.; and the face layer perpendicular to the studs and attached with 2¼" Type S screws spaced 12" o.c. Place face layer end joints between studs and secure with 1½" Type G screws 8" o.c.

D Fire-Rated 4-hr. Assembly—For 4-hr. assembly, erect steel runners, steel studs and liner panels as described in section A, then continue construction as follows:

Position second layer liner panels vertically over studs and fasten to studs and runners with 1½" Type S screws spaced 6" from top and bottom and 24" o.c. Apply ¾" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base layer vertically over liner panels; attach with 2¼" Type S screws staggered from screws in liner panel layer, spaced 24" o.c. and driven into studs.

Install metal furring channels horizontally over gypsum panel or base at ceiling and spaced 24" o.c. vertically. Fasten top channel to studs and runner with 2¼" Type S screws spaced 12" o.c. and alternated on channel flanges. Fasten other channels to studs with screws 24" o.c. in top channel flange.

Install second layer ¾" SHEETROCK brand Gypsum Panels, FIRECODE C Core, or IMPERIAL FIRECODE C Gypsum Base vertically over furring channels with vertical joints staggered 24" from joints in first layer. Fasten panels or base to channels with 1" Type S screws spaced 1" from vertical edges, 12" o.c. in top channel and 24" o.c. in other channels. Install face layer vertically over second layer with vertical joints staggered 24" and fasten to furring channels with 1½" Type S screws located ¾" and 6" from edges and spaced 12" o.c. in between.

E Vent Shaft Enclosure—Align floor, ceiling and sidewall runners according to partition layout. Fasten runners securely to structural supports with suitable fasteners 24" o.c. Install 1½" USG Steel Runners at ceiling by fastening through web. Install 1½" x ¾" x 24-ga. galvanized steel angles as runners on floor and sidewalls by fastening through their short legs. As an alternate, steel angles may be used as ceiling runners. Install side angle runners 30" long and centered for attachment of horizontal bracing angles.

Install 1½" x ¾" x 22-ga. galvanized steel bracing angles horizontally at quarter-points between floor and ceiling and spaced max. 5' o.c. Position long leg vertically for board attachment and fasten to sidewall angle with 1" Type S screws.

Install ¾" SHEETROCK brand Gypsum Panels, FIRECODE C Core, vertically on shaft side and fasten to angles and runners with 1"

Type S screws 16" o.c. Apply a SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed, on back side of coreboard and strip or sheet-laminate to shaft-side board with vertical joints offset 12" from inner board joints.

Install second set of floor and sidewall angle runners (and ceiling angles, if required) with long legs against coreboard. Attach coreboard to runners and angles with 2¼" Type S screws 12" o.c. and at least 6" away from coreboard edges.

Using strip or sheet method, laminate floor-side face board to coreboards. Install face boards vertically with joints offset 12" from coreboard joints. Apply moderate pressure when placing boards to assure good adhesive bond. Fasten to coreboard with 1½" Type G screws.

Drive screws approx. 24" from ends of boards and 36" o.c. along lines ½" from vertical edges. Temporary nails or support bracing installed 16" to 24" o.c. may be used instead of screws to maintain bond until adhesive is hard and dry. After all attachments are made, wipe off any adhesive forced out at joints and edges. Caulk perimeter of face panels with SHEETROCK Acoustical Sealant to prevent air infiltration. If desired, complete the assembly with the appropriate drywall or veneer finish application.

3.2 Accessory Application

A Gypsum Panel Joints—Finish all face layer joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

B Gypsum Base Joints—Use SHEETROCK Setting-Type Joint System installed according to manufacturer's directions.

C Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with clinch-on tool or staples 9" o.c. on both flanges along entire length of bead.

D Metal Trim—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 9" o.c.

E Screws—Power-drive at least ¾" from edges or ends of gypsum panels to provide uniform dimple ½" deep. In gypsum base, set flush with surface without tearing face paper.

F Control Joints—Break panels behind joint. Apply acoustical sealant to fill gap and attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

Trademarks: The following trademarks are owned by United States Gypsum Company or a related company: USG, SHEETROCK, FIRECODE, DUR-A-BEAD, THERMAFIBER, IMPERIAL, RC-1, DUROCK, DURABOND, EASY SAND. Type S and S-12 are a trademarks of ITW Buildex. UNIMAST is a trademark of Unimast Inc.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

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United States Gypsum Company

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Gypsum Panels & Accessories

There is only one SHEETROCK—the brand of gypsum panels for interior walls and ceilings developed and constantly improved by United States Gypsum Company. This product, in the last 40 years, has revolutionized construction—to the point that today more than 90% of all new residential buildings are finished with gypsum panels. Systems using SHEETROCK brand Gypsum Panels now have gained the same acceptance in commercial building.

A SHEETROCK brand Gypsum Panel is mill-fabricated and composed of a fire-resistant gypsum core encased in a heavy natural-finish paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth.

Gypsum panels are produced in specialized forms for various applications. Complementing these is the industry's broadest line of accessories, adhesives and joint treatment materials to provide complete partition, ceiling and floor assemblies. This catalog covers these products in five groups: (1) Gypsum Panel Products; (2) Trim Accessories; (3) Metal Products; (4) Screws and Adhesives; (5) Joint Treatment and Texture Products. A general specification appears on pages 9-12; detailed data on assemblies using these components are covered in pertinent United States Gypsum Company System Folders.

Interior walls and ceilings built with SHEETROCK brand Gypsum Panels gain a durable surface suitable for most types of decorative treatment and for repeated decoration during the life of the building. Joints between adjacent panels may be reinforced and concealed with a United States Gypsum Company joint treatment system, or featured by leaving exposed or covering with decorative mouldings.

Dry Construction—factory-produced gypsum panels eliminate excessive moisture in construction.

Speed—panels are easily cut and quickly applied.

Quick Decoration—essentially a "dry" material, gypsum panels permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F. until completely calcined—a slow process. See Construction Selector SA-100 for fire-resistance ratings.

Crack Resistance—with joints reinforced with a United States Gypsum Company joint system, SHEETROCK brand Gypsum Panels form walls and ceilings highly resistant to cracks caused by frame movement, vibration or minor settling.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible.

Availability—over 20 strategically located operating plants produce and/or stock the gypsum panel materials described here. Special distribution centers, in addition to these plants, increase total service efficiency to major markets and rural areas from coast to coast. All standard or specialty gypsum panel products may be considered readily available and easily procured upon short notice.



General Limitations

- 1 Exposure to excessive or continuous moisture and extreme temperatures should be avoided. Gypsum board is not recommended in solar heating systems where board will be in contact with surfaces exceeding 125°F. (52°C).
- 2 Must be adequately protected against wetting when used as a base for ceramic wall tile (see foil-back panel limitation). Use SHEETROCK brand Gypsum Panels, Water-Resistant, for this purpose.
- 3 Maximum spacing of framing members: $\frac{1}{2}$ " and $\frac{5}{8}$ " gypsum panels are designed for use on framing centers up to 24"; $\frac{3}{8}$ " and $\frac{1}{4}$ " panels, on centers up to 16". In both walls and ceilings when $\frac{1}{2}$ " or $\frac{5}{8}$ " gypsum panels are applied across framing on 24" centers and joints reinforced, blocking is not required. Neither $\frac{3}{8}$ " nor $\frac{1}{4}$ " SHEETROCK brand Gypsum Panels are recommended for use on steel framing nor as base for water-based texturing materials. When a water-based texture is used on ceilings with framing 24" o.c., $\frac{5}{8}$ " gypsum panels, $\frac{1}{2}$ " FIRECODE C core panels, or $\frac{1}{2}$ " SHEETROCK brand Interior Gypsum Ceiling Board should be used to prevent sag. See System Folders for recommended framing spacing.
- 4 Application of SHEETROCK brand Gypsum Panels over $\frac{3}{4}$ " wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be 2"x2" minimum (may be nom. 1"x4" if panels are to be screw-attached).

- 5 The application of gypsum panels over an insulating blanket that has first been installed continuously across the face of the framing members is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.
- 6 To prevent objectionable sag in new gypsum panel ceilings, the weight of overlaid unsupported insulation should not exceed 1.3 psf for ½" thick panels with frame spacing 24" o.c.; 2.2 psf for ½" panels on 16" o.c. framing and ⅝" panels 24" o.c.; ⅝" thick panels must not be overlaid with unsupported insulation. A vapor retarder should be installed in exterior ceilings, and the plenum or attic space should be properly vented.
- During periods of cold or damp weather when a polyethylene vapor retarder is installed on ceilings behind the gypsum board, it is important to install the ceiling insulation before or immediately after installing the ceiling board. Failure to follow this procedure can result in moisture condensation on the back side of the gypsum board, causing the board to sag.
- 7 To produce final intended results, certain recommendations regarding surface preparation, painting products and systems must be adhered to for satisfactory performance (see good design practices, page 9 for details).

- 8 Precaution should be taken against creating a double vapor retarder by using gypsum panels as a base for highly water vapor-resistant coverings when the wall already contains a vapor retarder. Moreover, do not create a vapor retarder by such wall coverings on the interior side of exterior walls of air-conditioned buildings in hot-humid climates where conditions dictate a vapor retarder location near the exterior side of the wall. Such conditions require assessment of a qualified mechanical engineer.

Technical Data

SHEETROCK brand Gypsum Panels comply with ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40°—100°F.); hygrometric coefficient of expansion (unrestrained): 7.2×10^{-6} in. per in. per % r.h. (5%—90% r.h.). Surface burning characteristics: flame spread 15, smoke developed 0.

Gypsum Panel Products

SHEETROCK brand Gypsum Panels have long edges tapered on the face side to form a shallow channel for joint reinforcement. Made in the four thicknesses shown below for specific purposes.

Where to use SHEETROCK brand Gypsum Panels

	Interior Walls									
	Single layer					Double layer				
	Over existing walls	Masonry (furred)	Wood framing	Steel framing	Masonry & concrete (direct)	Masonry (furred) Base Finish	Wood framing Base Finish	Steel framing Base Finish		
Regular										
SHEETROCK ¼"	X						X	X		
⅜"	X						X	X		
½" & ⅝"		X	X	X	X	X	X	X	X	X
ULTRACODE										
SHEETROCK ¾"				X					X	X
FIRECODE										
SHEETROCK ⅝"		X	X	X		X	X	X	X	X
FIRECODE C										
SHEETROCK ½"		X	X	X		X	X	X	X	X
⅝"		X	X			X	X	X	X	X
Foil-Back⁽¹⁾										
SHEETROCK ¾"										
½" & ⅝"										
Water-Resistant⁽²⁾										
SHEETROCK ½" & ⅝"			X	X	X	X	X		X	
Interior Ceiling Board										
SHEETROCK ½"										
Exterior Ceiling Board										
SHEETROCK ½"										
TEXTONE										
TEXTONE ½" & ⅝"	X	X	X	X	X	X	X	X	X	

(1) Not recommended in hot-humid climates. (2) Recommended as a base for ceramic or other tile. Also available in FIRECODE and FIRECODE C Cores (3) Not recommended as a base for ceramic tile or as a base layer for TEXTONE Vinyl-Faced Gypsum Panels in double-layer systems.

SHEETROCK brand Gypsum Panels, FIRECODE C Core, made in $\frac{1}{8}$ " and $\frac{1}{2}$ " thicknesses, provide improved fire protection over standard FIRECODE panels as a result of a specially formulated core containing special additives that enhance the integrity of the core under fire exposure. Comply with Type X requirements.

Systems using these gypsum panels have qualified for fire ratings of up to 4 hours in walls, 3 hours in ceilings, 4 hours for column protection. Construction Selector shows the many variations of tested assemblies.

Limitations (also refer to General Limitations, page 1): (1) In order to attain fire-resistance ratings, the construction of the partition and/or floor and ceiling assemblies must conform to the system designs as tested at the indicated fire testing facilities (see System Folders). (2) Max. frame member spacing: 24" o.c.

SHEETROCK brand Gypsum Panel Application and Frame Spacing

thickness	approx. panel weight psf	location	application method	max. frame spacing o.c.
$\frac{1}{8}$ " ⁽¹⁾	1.4	ceilings ⁽²⁾⁽³⁾	perpendicular	16"
$\frac{1}{8}$ " ⁽¹⁾	1.4	sidewalls	perpendicular or parallel	16"
$\frac{1}{2}$ "	1.8	ceilings	parallel ⁽³⁾	16"
$\frac{1}{2}$ "	1.8	sidewalls	perpendicular or parallel	24" ⁽⁴⁾
$\frac{3}{8}$ "	2.3	ceilings	parallel ⁽³⁾	16"
$\frac{3}{8}$ "	2.3	sidewalls	perpendicular or parallel	24"

(1) For wood framing only. Also see general limitations, page 1. (2) Not recommended below unheated spaces. (3) Not recommended if water-based texturing material is to be applied. (4) Max. spacing 16" if water-based texturing material is to be applied. If $\frac{1}{8}$ " SHEETROCK brand Interior Gypsum Ceiling Board is used in place of gypsum panels, max. spacing is 24".

SHEETROCK brand Gypsum Panels, Foil-Back, are made by laminating special kraft-backed aluminum foil to back surface of regular or SW tapered panels with FIRECODE and FIRECODE C cores as indicated above. Effective as a vapor retarder for walls and ceilings when applied with foil surface next to the framing in single-layer application or as the base layer in multi-layer systems. SHEETROCK brand Gypsum Panels, Foil-Back, provide a water vapor retarder to help prevent interior moisture from entering wall and ceiling spaces. In tests per ASTM E96 (desiccant method), $\frac{1}{2}$ " foil-back panels showed a vapor permeance of 0.06 perm.

These panels are designed for interior use with furred masonry, wood or steel framing. In air conditioned buildings in climates having sustained high outside temperature and humidity, a qualified mechanical engineer should determine vapor retarder location.

Limitations: Not recommended as a base for ceramic or other tile or as base layer for TEXTONE Vinyl-Faced Gypsum Panels or other highly moisture-resistant wall coverings. Also not to be used in hot, humid climates such as the Southern Atlantic and Gulf Coast areas.

Thickness: $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ ". Sizes, edges and finish: same as for base panels.

SHEETROCK brand Gypsum Panels, Water-Resistant, are a proven water-resistant base for the adhesive application of ceramic and plastic tile and plastic-faced wall panels. Made water-resistant all the way through: (1) multi-layered face and back paper are chemically treated to combat penetration of moisture; (2) the gypsum core is made water-resistant with a special composition. The panel is easily recognized by its distinctive green face.

Available in $\frac{1}{8}$ " and $\frac{3}{8}$ " thickness; in $\frac{1}{2}$ " SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE C Core, to provide fire resistance for UL Design Nos. U307, U317, U603, U612, and U613; and in $\frac{5}{8}$ " SHEETROCK brand Gypsum Panels, Water-Resistant, FIRECODE Core, to provide fire resistance for UL Design Nos. U301, U302, U305, U321, U411, U465, U504, U505, U506, U512, U513, U515, U603, U604, U606, U607, U609, U615, U616, U617, U622, U625, U633, U637, X508 and X516. Surface burning characteristics: flame spread 20, smoke developed 0. Comply with ASTM C630. Width: 4'; length: 8', 10' or 12'; edges: tapered; finish: green treated paper, suitable for receiving tile, paint or wallpaper.

Limitations: adherence to recommendations concerning sealing edges, painting, tile adhesives, framing and installation is necessary for satisfactory performance (see Folder SA-924). Not recommended for ceilings where framing is greater than 12" o.c., for single-layer resilient attachment where tile is to be applied or in remodeling unless applied directly to studs. Panels should not be installed over a vapor retarder or on a wall acting as a vapor retarder unless it will not be tiled or finished with an impervious paint. Store in an enclosed shelter and protect from exposure to the elements. Panels are not intended for use in areas subject to constant moisture such as gang showers and commercial food processing; DUROCK Interior Cement Boards are recommended for these uses (see Folder SA-932).

Bending of SHEETROCK brand Gypsum Panels⁽¹⁾

panel thickness		bending radii with dry panels			
		panel applied with long dimension perpendicular to framing		panel applied with long dimension parallel to framing	
in.	mm	ft	m	ft	m
1/8	6.4	5 ⁽²⁾	1.5	15	4.6
3/8	9.5	7 1/2	2.3	25	7.6
1/2	12.7	20 ⁽²⁾	6.1	—	—

(1) For steel-framed systems and bending with wetted panels, see folder SA-923. (2) Bending two $\frac{1}{8}$ " pieces successively permits radii shown for $\frac{1}{4}$ " panels.

NOTE: By moistening the face and back paper thoroughly prior to application, and replacing in the stack for at least one hour, the panel may be bent to still shorter radii. When the panel dries thoroughly, it will regain its original hardness.

TEXTONE Vinyl-Faced Gypsum Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, relocatable partitions or in remodeling. Not recommended as a finish layer over foil-back gypsum panels or on exterior walls in hot and humid climates unless suitable vapor control is provided by mechanical engineer. See Technical Folder SA-928 for descriptions and specifications.

SHEETROCK brand Gypsum Coreboard has a 1" thick gypsum core encased in strong, gray paper on both sides. It is used in laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6" to 8" o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1"; width: 24"; edges: "V" T&G or square; length: 8', 9', 10' and 12' (prescored—7' 8" lengths only); finish: gray paper, unsuitable as exposed surface. (Special order availability prevails in some markets.) Meets ASTM C442.

SHEETROCK brand Gypsum Liner Panels have a special 1" thick gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in Shaft Wall Partitions (see Folder SA-926), Area Separation Walls (see Folder SA-925), High-Attenuation Double Wall Systems (see Folder SA-921) and High Performance Floor Ceiling Assemblies (see SA-924). Panels have beveled edges, are 1" thick, 24" wide, and in lengths up to 16' (14' in some markets).

SHEETROCK brand Exterior Gypsum Ceiling Board is a weather- and sag-resistant board designed for the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect weather exposure. It is noncombustible, is simply scored and snapped for quick application, and offers excellent paintability. Surface burning characteristics: flame spread 20, smoke developed 0. Meets ASTM C931.

Installed conventionally in wood and steel-framed soffits; batten strips or mouldings used over butt joints or treated joints; backing strips required for small vent openings. Has beige, water-repellent face paper. Thickness: $\frac{1}{2}$ "; widths: 4'; lengths: 8' and 12'; edges: SW tapered. Also available $\frac{5}{8}$ " thick with FIRECODE core which is suitable for fire-rated assemblies.

SHEETROCK brand Interior Gypsum Ceiling Board, a $\frac{1}{2}$ " thick panel, supports water-based spray texture paints and insulation like $\frac{5}{8}$ " thick board but with in-place construction costs that are less. Special gypsum core contains additives which increase sag-resistance. Lightweight for easy handling. Surface burning characteristics: flame spread 15, smoke developed 0. Thickness: $\frac{1}{2}$ "; width: 4'; lengths: 8' and 12'; edges: tapered. Meets ASTM C36.

SHEETROCK brand Gypsum Sheathing is a fire-resistant gypsum board, with water-resistant gypsum core encased in specially formulated brown water-repellent paper on both sides and long edges. Its weather resistance, water repellence, fire resistance and low applied cost make it suitable for use in exterior curtain wall construction; also a popular choice for wood-framed garden apartments and light commercial buildings (see Folder SA-924 for application and specifications). Meets ASTM C79. Available 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' and 9' lengths with square edges. Thickness: $\frac{1}{2}$ " Regular and $\frac{5}{8}$ " FIRECODE core sheathing boards.

GYP-LAP Gypsum Sheathing is a weather- and fire-resistant board used in exterior curtain walls and in frame construction (see Folder SA-924). Lightweight board has noncombustible gypsum core clad in water-repellent paper on face and back surfaces. Meets ASTM C79. Available in western U.S., $\frac{1}{2}$ " thick, 24" wide, 8' length with V-shaped T&G long edges and 48" wide, 8' length with square edges. Also available: $\frac{5}{8}$ " thick FIRECODE core sheathing board.

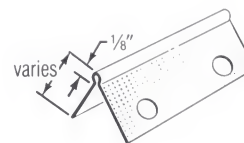
Sheathing Limitations

- 1 Sheathing may be stored outside for up to one month, but must be stored off the ground and have protective covering.
- 2 Maximum stud spacing is 24" o.c.
- 3 When applied to a structure, sheathing must not be left exposed to the elements for more than one month unless the procedure as outlined in limitation 6 is followed.
- 4 Exterior finish systems must be properly caulked for the life of the job, particularly around all cuts.
- 5 Exterior finish systems applied over gypsum sheathing must be applied with mechanical fasteners through the sheathing into the wall framing. Alternate methods of application are not endorsed and their performance and that of the substrate are solely the responsibility of the specifier. Direct application of paint, texture finishes and coatings over gypsum sheathing are not recommended.
- 6 For in-place exposure up to six months, all gaps resulting from cuts, corners, joints and machine end cuts of the sheathing should be filled with exterior caulk at time of erection.
- 7 For curtain wall construction, cover gypsum sheathing with No. 15 asphalt felt within 30 days of sheathing erection. Felt should be applied horizontally with 2" overlap and immediately anchored with metal lath, masonry ties or corrosion-resistant screws or staples.
- 8 Sheathing for exterior ceilings and soffits is not recommended unless covered with metal lath and exterior stucco.

Trim Accessories*

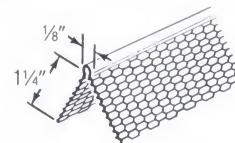
DUR-A-BEAD Corner Bead

Part of the family of SHEETROCK Metal Products. All-metal galvanized steel reinforcement, protects external corners. Concealed with United States Gypsum Company joint compounds for a smooth, finished corner. Provides superior joint compound adhesion. Available in two flange widths: No. 103 $1\frac{1}{2}$ "x $1\frac{1}{4}$ " and No. 104 $1\frac{1}{2}$ "x $1\frac{1}{4}$ ".



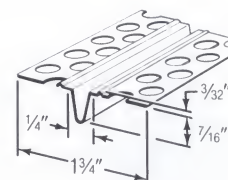
SHEETROCK Corner Bead No. 800

Galvanized steel external corner reinforcement with $\frac{1}{4}$ " grounds and $1\frac{1}{2}$ " wide fine-mesh expanded flanges. Nailed to framing through panels or stapled to panels. Provides superior key for joint compounds and eliminates shadowing and edge cracking.



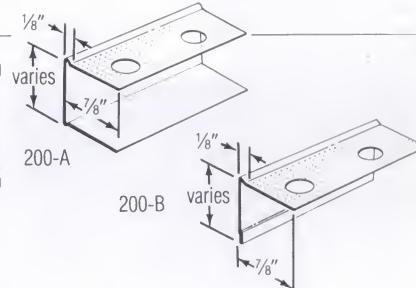
SHEETROCK Zinc Control Joint No. 093

Relieves stresses of expansion and contraction across the joint in large ceiling and wall areas. Made from roll-formed zinc with a tape-protected $\frac{1}{4}$ " opening $\frac{1}{4}$ " deep. Length: 10'. Limitation: where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.



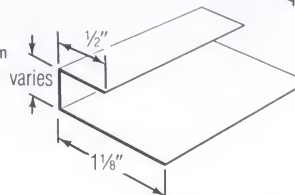
SHEETROCK Metal Trims

Provide protection and neat finished edges to gypsum panels at window and door jambs, ceiling angles and intersections where panels abut other materials. Nailed through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering. Finished with joint compounds (except 400). Made in following types:



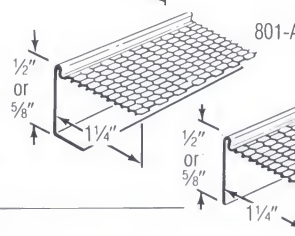
200 series

Steel casing, includes No. 200-A J-shaped channel in $\frac{1}{2}$ " and $\frac{3}{4}$ " sizes; No. 200-B L-shaped angle edge trim without back flange to simplify application, in $\frac{1}{2}$ " and $\frac{3}{4}$ " sizes.



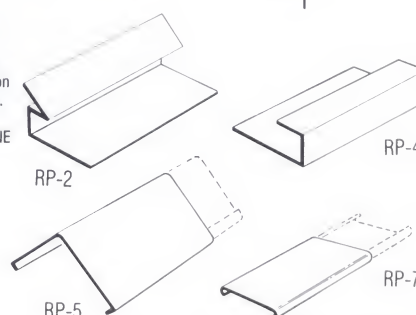
400 series

Reveal type trim, requires no finishing compound, includes No. 400 in $\frac{3}{4}$ " size, No. 401 in $\frac{1}{2}$ ", No. 402 in $\frac{3}{8}$ " size.



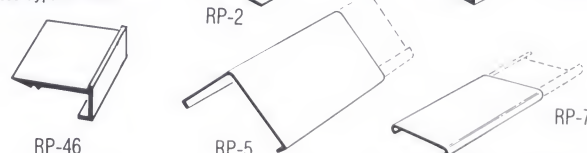
800 series

Expanded-flange trim used to provide edge protection at cased openings and ceilings or wall intersections. Includes 801-A J-shaped and 801-B L-shaped trim, both in $\frac{1}{2}$ " and $\frac{3}{4}$ " sizes.



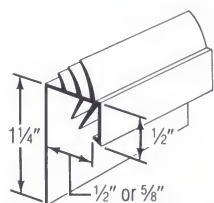
USG Rigid Vinyl Trim (RP Series)

Vinyl plastic in Almond and Ash Blue. Available for $\frac{1}{2}$ " and $\frac{3}{4}$ " thick panels; lengths: 8', 9' 10"; shapes: RP-2 Inside Corner, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten, RP-46 Ceiling Drive-In Trim. RPV series trims also available factory-laminated to match TEXTONE Vinyl-Faced Gypsum Panels.



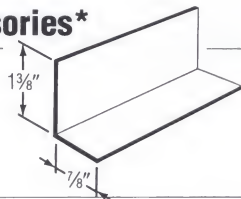
*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Reveal type, white plastic trim with flanges and web of rigid vinyl and integral flexible vinyl fins that compress on installation. Fins form permanent flexible seal to effectively block sound, replace caulking, provide structural stress relief at panel perimeter. Requires no finishing compound; includes P-1A in $\frac{1}{2}$ " size. P-1B in $\frac{3}{8}$ " size.

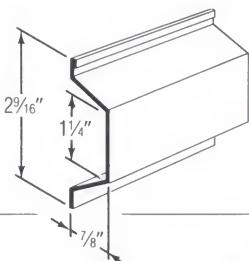


UNIMAST Metal Angles

1½" x 7/8" corrosion-resistant steel angle sections used as runners to secure and brace 1" coreboard in laminated gypsum partitions. 2½" x 2½" size made for High Attenuation Double Wall Systems. Length: 10'.



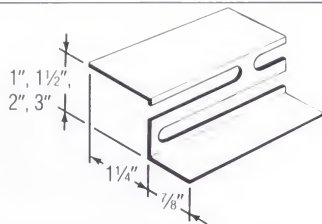
Hat-shaped channels for ceiling and wall furring. Roll-formed from two gauges of corrosion-resistant steel. DWC-25 for screw attachment of $\frac{1}{2}$ " and $\frac{5}{8}$ " gypsum panels. DWC-20 for greater spans and load-carrying capacity in ceiling applications. Products comply with ASTM C645. Face width: $1\frac{1}{4}$ ", depth: $\frac{3}{4}$ "; length: 12'



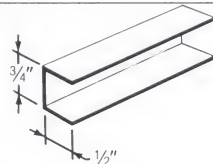
Made of galvanized wire for attaching DWC-25 Metal Furring Channels to 1½" cold rolled channels. Installed on alternate sides of carrying channels; where clips cannot be alternated, wire tying recommended.



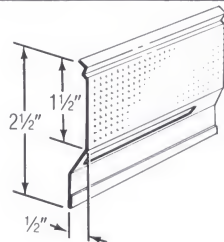
Mechanically attach THERMAFIBER, mineral and rigid foam insulations and SHEETROCK brand Gypsum Panels to interior surfaces of monolithic concrete and masonry walls. Also for attaching insulation and gypsum panels to interiors of existing walls and ceilings. Made of corrosion-resistant steel; furring depths: 1" 1 1/2" 2" 3"; length: 8'6".



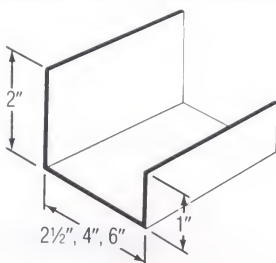
Made of 16-ga. steel, used for furring and in suspended ceilings and partitions. Available either galvanized or black asphaltum painted. Sizes: $\frac{3}{4}$ ", with $\frac{1}{8}$ " flange; $1\frac{1}{2}$ " and 2" with $\frac{1}{32}$ " flange. Length: 16' and 20'.



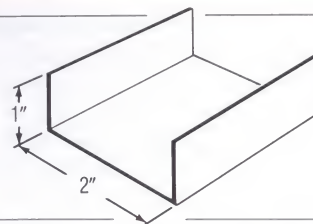
Part of the family of SHEETROCK Metal Products. Corrosion-resistant steel channel for resilient attachment of gypsum panels to wood and steel framing. Reduces sound transmission through wood and steel framed partition and floor-ceiling assemblies. Width: 2½"; depth: ½"; length: 12'. Limitation: not for use beneath highly flexible floor joists; should be attached to walls or ceilings with 1½" coarse thread or drywall steel screws; not suitable for use with more than 2 layers ½" thick gypsum panels.



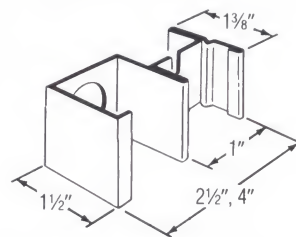
Used at floor and ceiling in shaft wall assemblies and for special stud framing, made with unequal legs in 2½", 4" and 6" widths; styles: 212JR24, 212JR20, 400JR24, 400JR20, 600JR24, 600JR20; length: 10'.



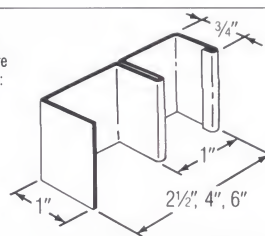
USA Steel CR-Runners
For solid area separation walls: 2" width, style 200CR25, 10' length.



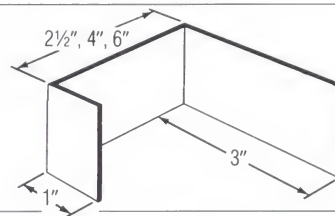
Rigid, roll-formed sections for cavity shaft walls shaped to engage 1" liner panels. Widths: 2½" and 4"; styles: 212CH25, 212CH22, 212CH20, 400CH25, 400CH20; lengths as required.



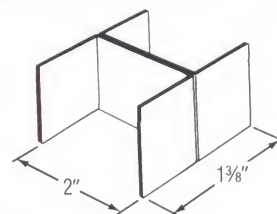
Used singly for cavity shaft walls to cap partition or both sides of closure panel; widths: 2½", 4" and 6"-; styles: 212ES25, 212ES20, 400ES25, 400ES20, 600ES25, 600ES20; lengths as required.



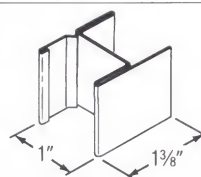
Used in jamb framing for fire-rated shaft wall elevator door frames. Widths: 2½", 4" and 6"; style: 212JS20, 400JS20, 600JS20, length: 10'.



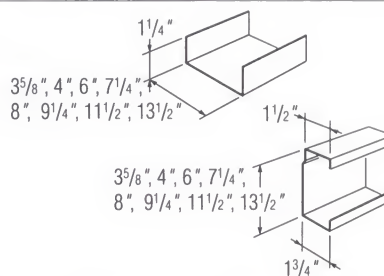
Slide over and engage edges of adjacent liner panels for solid area separation walls. Width: 2"; style: 200HS25; length: 8' to 16'.



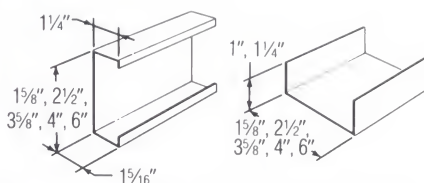
Roll-formed from 20-ga. steel for high-performance drywall partition systems. Slides over and engages edges of adjacent 1" gypsum liner panels. Width: 1"; length: 8' to 12'.



Channel-shaped, roll-formed, with corrosion-resistant coating. Widths: 3 $\frac{3}{4}$ ", 4", 6", 7 $\frac{1}{4}$ ", 8", 9 $\frac{1}{4}$ ", 11 $\frac{1}{2}$ " and 13 $\frac{1}{2}$ "; stud styles: SJ20, SJ18, SJ16, SJ14. Stud lengths: as required. Runners come in stud widths, 10' length only.



Channel-shaped, roll-formed, with corrosion-resistant coating. Stud widths: 1½" (for ST25 only), 2½", 3½", 4", 6" stud styles: ST25, ST22, ST20. Stud lengths: 8' to 16'. Runners come in stud widths, 10' length only.



*All framing, furring and trim accessories sold by United States Gypsum Company are produced by Unimast Incorporated.

Screws

SUPER-TITE Screws are high quality, economical screws for interior framing applications. These self-drilling, self-tapping steel screws have specially designed drill point and threads to assure fast penetration into steel and wood framing. Meet ASTM C1002. Sizes available: 1", 1½", 1¾", 1⅝", 2", 2¼", 2½", 3" Bugle Head for attaching gypsum panels to 20 and 25-ga. steel framing; 1¼" W Bugle Head for attaching panels to wood framing; ⅞" Pan Head Screws for securing 20 and 25-ga. studs to runners. **SUPER-TITE II Screws**, having alternate high and low threads, are available in the same sizes as SUPER-TITE Bugle Head Screws. **SUPER-TITE DRILLERS Screws** have sharp drilling flutes capable of penetrating 14-ga. steel. Meet ASTM C954. Self-drilling Bugle Head Screws in 1", 1½", 1¾", 1⅝", 1⅞", 2⅝", 2⅞" and 3" sizes are used for attaching gypsum panels to steel framing up to 14-ga. DRILLERS also come in ⅞" Pan Head Screw for anchoring up to 14-ga. studs to runners.

Buildex Screws are aimed at producing the best possible attachments of SHEETROCK brand Gypsum Panels. Their development not only has improved installation methods but has made possible today's broad selection of drywall systems applied over steel framing. Screws must be used with such systems. Type S meets ASTM C1002; Type S-12 meets ASTM C954.

Insulation

Thermafiber Insulation is a mineral fiber product ideal for improving sound control in partition and floor-ceiling constructions.

Sound Attenuation Fire Blankets (SAFB) are a paperless, semi-rigid mineral fiber mat designed to improve STC ratings when installed in steel stud partitions and wood-frame construction. Fire-resistant Fire Safety FS-15 Blankets are used to provide noncombustible exterior wall furring and steel stud curtain wall assemblies. They are open-faced and require separate vapor retarder (see Folder SA-707).

Adhesives and Acoustical Sealant

Drywall Adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding—also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels in multi-layer fire-rated or non-rated partitions and ceilings are **SHEETROCK Setting-Type (DURABOND)** or **Lightweight Setting-Type (EASY SAND) Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application or **SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed**. These compounds provide tight bond when dry yet permit adjustment of panels after contact.

Recommended adhesives for non-fire-rated construction are a solvent-based stud adhesive which meets ASTM C557 or a rubber-based construction adhesive for subfloors and plywood construction which meets ASTM C557 and American Plywood Association Performance Standard AFG-01. Laminating and liquid contact adhesives are also commercially available. These adhesives bridge minor irregularities in the base or framing, make it easier to form true joints and level surfaces. The use of adhesive adds strength to an assembly, reduces fasteners required, helps eliminate loose panels and nail pops.

SHEETROCK Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems and sealing exterior walls to reduce infiltration. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and lasting seal. Flame spread 5, smoke developed 0. Meets ASTM C557 requirements, complies with ASTM C919.

Firestop System

FIRECODE Compound is a compound developed for use with THERMAFIBER Safing Insulation to provide floor and wall through-penetration firestop systems that combine exceptional economy and performance. Effectively seals openings around pipe and cable poke-through openings, blocking particulate, fire, sound, smoke and air movement. Meets ASTM E814 and UL 1479 in tests conducted at Underwriters Laboratories. Refer to SA-727 for information on the USG Firestop System pictured below.



A. FIRECODE Compound mixes easily with water at jobsite. There's less waste than with caulking tube products.



B. THERMAFIBER Safing Insulation, the forming material, is fit snugly into penetration to provide a fire barrier.



C. FIRECODE Compound is troweled into penetration to block particulate, fire, sound, smoke and air movement.

Joint Treatment and Texture Products

Today's complete United States Gypsum Company joint treatment line includes both ready-mixed and powder products in drying and setting types. All are formulated without asbestos to meet OSHA and Consumer Product Safety standards pertaining to asbestos. In addition to conventional joint finishing and fastener spotting, certain products are designed for repairing cracks, patching, spackling, back-blocking, texturing and for laminating gypsum panels in double-layer systems. These joint compounds meet ASTM C475.

United States Gypsum Company also produces the industry's broadest line of texture finishes to provide distinctive appearance and surface decoration to gypsum panel walls and ceilings. A full line of both ready-to-use and powder products is offered to create fine, medium or coarse textures, sand or simulated acoustical finishes and interesting spatter, spatter/knockdown, "orange peel" or light to medium stipples. For available texture products, often applied by the same trade which finishes gypsum drywall, refer to Texture and Finish Products Folder SA-933.

Also available is SHEETROCK First Coat, a superior, latex prime coat that equalizes surface absorption and texture differences of finished drywall to minimize drywall decoration problems and provide beautiful walls and ceilings.

General Limitations

- 1 United States Gypsum Company joint compounds are not compatible with and should not be intermixed with any other compounds.
- 2 For interior use only—except SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds; not recommended for laminating—except SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds, and SHEETROCK All Purpose and Taping Joint Compounds Ready-Mixed.
- 3 Protect bagged and cartoned products against wetting; protect ready-mixed products from freezing and extreme heat.
- 4 Each compound coat must be dry before the next is applied—except SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds—and completed joint treatment must be thoroughly dry before decorating.
- 5 Only SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds are recommended for treating joints of SHEETROCK brand Gypsum Panels, Water-Resistant, to be covered with ceramic or plastic tile (do not use other compounds).

SHEETROCK Joint Tape is a strong, cross-fibered paper tape with minimal longitudinal stretch and superior tensile strength. Lightly pre-creased for corner application. For estimating purposes: for 1,000 sq. ft. of surface area to be finished, approximately 370 lin. ft. of tape and 83 lb. of drying-type powders, 72 lb. of setting-type powders, 52 lb. of lightweight setting-type powders, 138 lb. of ready-mixed type or 9.4 gallons of SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) are required.

Ready-Mixed Joint Compounds

SHEETROCK Ready-Mixed Joint Compounds are non-asbestos, vinyl-based formulations specially premixed to a creamy, smooth consistency. They offer excellent slip and bond, easy workability. Joint finishing is fast, easy and smooth, reducing labor costs and improving appearance and quality of the job.

Limitation: protect wet joints and container from freezing.

SHEETROCK Taping Joint Compound Ready-Mixed is a high-performance product for embedding tape and also used for laminating.

SHEETROCK Topping Joint Compound Ready-Mixed is a low-shrinkage, easily applied and sanded product recommended for

second and third coats over ready-mixed taping and all purpose compounds. Also used for simple texturing or skim coating. Not suitable for embedding tape or as first coat over metal corners, trim and fasteners.

SHEETROCK All Purpose Joint Compound Ready-Mixed used for embedding, finishing, simple texturing, laminating and skim coating. Combines single-package convenience with good taping and topping characteristics. Recommended for repairing cracks in interior plaster and masonry not subject to moisture.

SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) offers all benefits of a conventional product. Exclusive advantages: weighs up to 35% less, requires only two coats over metal trim and fasteners, gives exceptional ease of sanding. This all purpose, single package product provides tight bond, superior slip and workability, good crack resistance and low shrinkage. Also used for simple texturing.

Vinyl-Base Powder Joint Compounds

SHEETROCK Powder Joint Compounds are top-quality, non-asbestos, conventionally drying products providing easy mixing, smooth application and ample working time. Designed for embedding tape, for fill coats and finishing over drywall joints, corner bead, trim and fasteners. Also used for simple texture finishes for decorating variety.

SHEETROCK Taping Joint Compound is designed for embedding tape and for first fill coat on metal beads, trim and fasteners; also used for patching plaster cracks. Outstanding bond and resistance to tape cracking.

SHEETROCK Topping Joint Compound is a smooth-sanding material for second and third coats over taping compound or all purpose compound. Produces excellent feathering and superior finishing results.

SHEETROCK All Purpose Joint Compound incorporates good taping and topping characteristics in a single product. For use where finest results of the specialized compounds (above) are not necessary. Also has good texturing properties.

SHEETROCK Lightweight All Purpose Joint Compound (AP LITE) weighs 20% less than conventional compounds; offers lower shrinkage, better crack resistance, easier mixing, application and sanding.

SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds

These setting-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit same-day finishing and usually next-day decoration. Features exceptional bond; virtually unaffected by humidity extremes. Ideal for laminating double-layer systems, particularly fire-rated assemblies, and for adhering gypsum panels to above-grade concrete surfaces. May be used for skim coating and surface texturing and for filling, smoothing and finishing interior above-grade concrete. Also used to treat joints in exterior gypsum ceiling board; as prefill material for SHEETROCK brand Gypsum Panels, SW Edge; for treating joints of SHEETROCK brand Gypsum Panels, Water Resistant; treating fastener beads in areas to receive ceramic or plastic tile; and (except for SHEETROCK Lightweight Setting-Type Joint Compound) to embed tape and fill beads in veneer finish systems when rapid drying conditions exist. **Limitations:** SHEETROCK Setting-Type Joint Compounds (DURABOND) are difficult to sand after drying and must be smoothed before complete setting. Not to be applied over moist surfaces or surfaces likely to become moist, on below-grade surfaces, or on surfaces subject to moisture exposure, pitting or popping.

SHEETROCK Lightweight Setting-Type Joint Compound (EASY SAND)

weighs 25% less than conventional setting-type compounds for easier handling, faster application and improved productivity on the job. Provides sanding ease similar to a ready-mixed, all purpose joint compound. Offers varied setting times of 20 to 30 min. (EASY SAND 20); 30 to 80 min. (EASY SAND 45); 85 to 130 min. (EASY SAND 90); 180 to 240 min. (EASY SAND 210); and 240 to 360 min. (EASY SAND 300).

SHEETROCK Setting-Type Joint Compound (DURABOND) is available in a number of setting times to meet varying job requirements: 20-30 min. (DURABOND 20); 30 to 80 min. (DURABOND 45); 85 to 130 min. (DURABOND 90); 180 to 240 min. (DURABOND 210); and 240 to 360 min. (DURABOND 300).

Concrete Finishing Compound

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise); on ceiling areas below grade; on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping.

Wood Framing Requirements

Wood framing meeting these minimum requirements is necessary for proper performance of these gypsum panel assemblies.

- 1 Framework should meet the minimum requirements of local building codes.
- 2 Framing members should be straight, true, of uniform dimension, and framing should be properly aligned.
- 3 All framing lumber should be of a good grade for the intended use, and 2"x4" nominal size or larger should bear the grade mark of a recognized inspection agency.
- 4 All framing lumber should have a moisture content not in excess of 15% at time of gypsum panel application.
- 5 Do not attach panels to extremely soft framing members.

Failure to observe these minimum framing requirements, which are applicable to screw, nail and adhesive attachment, will materially increase the possibility of fastener failure and surface distortion, due to warping or dimensional changes. This is particularly true if framing lumber has greater than normal tendencies to warp or shrink after erection.

Heating and Ventilation Recommendations

Framing should approach as closely as possible the moisture content it will reach in service by allowing the building, after it is enclosed, to stand as long as possible prior to the application of the gypsum panels. Provide heat in winter or during damp conditions at a uniform temperature in the range of 55° to 70° F. Provide ventilation to remove excess moisture.

Good Design Practices

1 Specifications—The following comments and recommendations cover basic specifications for normal job requirements and are intended as minimum guide specifications which can be adapted to specific projects and conditions. These specifications are not intended to cover every possible design or job condition, but rather to assist in preparation of specifications.

2 Related Systems—Description, details and specifications on various systems are covered in these pertinent USG Corporation folders:

SA-700 DUROCK Exterior Cement Board Systems
SA-707 THERMAFIBER Life-Safety Fire Containment Systems
SA-727 USG Firestop System for Floor and Wall Penetrations
SA-921 USG High Sound-Attenuation Steel Framed Systems
SA-923 Drywall/Steel Framed Systems
SA-924 Drywall/Wood Framed Systems
SA-925 USG Area Separation Wall Systems
SA-926 USG Cavity Shaft Wall Systems
SA-932 DUROCK Interior Cement Board Systems
SA-933 Texture and Finish Products

3 Protection—Light gauge metal components such as steel studs and runners, furring channels and resilient channels should be given adequate protection in the warehouse and on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, use of components which offer increased protection against corrosion is recommended.

4 Shadowing and Spotting—Temperature differentials on the interior surface of exterior walls may result in collection of airborne dirt on the colder surface areas. Consequently accumulated dirt in the form of shadowing and spotting may occur at locations of fasteners or framing where surface temperatures usually are lowest. This is a natural phenomenon which occurs through no fault of the products. Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

- A The interior facing of SHEETROCK brand Gypsum Panels, Foil-Back, should be furred from the exterior wall studs using a base layer of panels screw-attached to the studs and horizontally applied metal furring channels spaced 24" o.c.
 - B On exterior masonry walls, install rigid or semi-rigid insulation between SHEETROCK Z-Furring Channels affixed to the interior side of wall and finish with SHEETROCK brand Gypsum Panels, Foil-Back.
 - C For maximum resistance to shadowing and spotting, a separate free-standing wall construction is recommended using studs that are independent of the exterior wall.
- 5 Painting Systems**—For satisfactory results, painting products and systems should be used which comply with recommendations and requirements in Appendixes of ASTM C840.

For priming and decorating with paint, texture or wall covering, follow manufacturer's directions for materials used. All surfaces, including applied joint compound, must be thoroughly dry, dust-free, and not glossy. Prime with SHEETROCK First Coat or with an undiluted, interior latex flat paint with high-solid content. Allow to dry before decorating.

To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and be decorated with a gloss paint (egg shell, semi-gloss or gloss), the gypsum panel surface should be skim coated with joint compound to equalize suction before painting.

- 6 Note**—United States Gypsum Company reserves the right to make changes or improvements in the design of all catalogued items without notice and without obligation to incorporate these changes or improvements in items already manufactured.
- 7 Additional Information**—See United States Gypsum Company technical folders in this series and in Sweet's General Building File. See UN-30 UNIMAST Steel Framing Systems: Technical Information for data on steel products.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All material described in this Folder manufactured by or for United States Gypsum Company shall be installed in accordance with its current printed directions.

All studs, runners and other accessories identified as UNIMAST products in this catalog are marketed by United States Gypsum Company as integral components of our gypsum board systems. Upon request United States Gypsum Company will provide certification that these products conform to the applicable Company and ASTM standards as well as meet the performance values identified herein.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F (13° to 21°C). Adequate ventilation shall be provided to carry off excess moisture.

Part 2: Products

2.1 Materials

- A** Gypsum Panels (in lengths as long as practical to minimize number of joints):
SHEETROCK brand (Regular, SW Edge, ULTRACODE Core, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).
SHEETROCK brand Foil-Back (Regular, SW Edge, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).
SHEETROCK brand Water-Resistant (Regular, FIRECODE Core, FIRECODE C Core) Gypsum Panels (thickness).
TEXTONE Vinyl-Faced Gypsum Panels (type) (pattern) (thickness).
- B** Gypsum Coreboard: SHEETROCK brand Coreboard (length).
- C** Gypsum Sheathing: (SHEETROCK brand Gypsum Sheathing, GYP-LAP Gypsum Sheathing) (FIRECODE) (size) (thickness).
- D** Exterior Ceiling Board: SHEETROCK brand Exterior Gypsum Ceiling Board (thickness).
- E** Interior Ceiling Board: SHEETROCK brand Interior Gypsum Ceiling Board (length).
- F** Insulation: THERMAFIBER Sound Attenuation Fire Blankets (thickness)(width). THERMAFIBER Commercial Insulation Blankets (thickness)(width).
- G** Interior Steel Studs and Runners
UNIMAST Steel Studs: 158ST25 (1 $\frac{1}{8}$ "), 212ST25 (2 $\frac{1}{2}$ "), 358ST25 (3 $\frac{5}{8}$ "), 400ST25 (4"), 600ST25 (6"), 212ST22 (2 $\frac{1}{2}$ "), 358ST22 (3 $\frac{5}{8}$ "), 400ST22 (4"), 600ST22 (6"), 212ST20 (2 $\frac{1}{2}$ "), 358ST20 (3 $\frac{5}{8}$ "), 400ST20 (4"), 600ST20 (6"), 362SJ20 (3 $\frac{5}{8}$ "), 40SJ20 (4").
UNIMAST Steel Runners: 158CR25 (1 $\frac{1}{8}$ "), 212CR25 (2 $\frac{1}{2}$ "), 358CR25 (3 $\frac{5}{8}$ "), 400CR25 (4"), 600CR25 (6"), 212CR22 (2 $\frac{1}{2}$ "), 358CR22 (3 $\frac{5}{8}$ "), 400CR22 (4"), 600CR22 (6"), 362CR20 (3 $\frac{5}{8}$ "), 400CR20 (4").
- H** Exterior Steel Studs and Runners
UNIMAST ST Style Studs: 212ST20 (2 $\frac{1}{2}$ "), 358ST20 (3 $\frac{5}{8}$ "), 400ST20 (4"), 600ST20 (6").
Note: Select CR20 Runner to match stud style.
UNIMAST SJ Style Studs: 362SJ20 (3 $\frac{5}{8}$ "), 362SJ18 (3 $\frac{5}{8}$ "), 362SJ16 (3 $\frac{5}{8}$ "), 362SJ14 (3 $\frac{5}{8}$ "), 40SJ20 (4"), 40SJ18 (4"), 40SJ16 (4"), 40SJ14 (4"), 60SJ20 (6"), 60SJ18 (6"), 60SJ16 (6"), 60SJ14 (6"), 725SJ18 (7 $\frac{1}{4}$ "), 725SJ16 (7 $\frac{1}{4}$ "), 725SJ14 (7 $\frac{1}{4}$ "), 80SJ18 (8"), 80SJ16 (8"), 80SJ14 (8").
UNIMAST Runners: Select CR-runner to match stud style. CR18 styles may be used with SJ16 and SJ14 studs.
- I** Metal Furring Materials: (UNIMAST Metal Furring Channels and Clips) (UNIMAST Adjustable Wall Furring Brackets) (UNIMAST Cold-Rolled Channels $\frac{3}{4}$ " or 1 $\frac{1}{2}$ ") (SHEETROCK Z-Furring Channels).
- J** Corner Angles: UNIMAST Metal Angles, 2 $\frac{1}{2}$ "x2 $\frac{1}{2}$ "x24 ga. corrosion-resistant steel, lengths as required.
- K** Corner Reinforcement: (DUR-A-BEAD Corner Bead No. 103, 104) (SHEETROCK No. 800).
- L** Metal Trim: SHEETROCK Metal Trim No. (200-A $\frac{1}{2}$ " or $\frac{5}{8}$ " , 200-B $\frac{1}{2}$ " or $\frac{5}{8}$ " , 400, 401 or 402, 801-A $\frac{1}{2}$ " or $\frac{5}{8}$ " , 801-B $\frac{1}{2}$ " or $\frac{5}{8}$ ").
- M** Plastic Trim: USG (P-1) (RP Series), Vinyl Trim.
- N** Resilient Channels: RC-1 Resilient Channel.
- O** Control Joint: SHEETROCK Zinc Control Joint No. 093.
- P** USG H-Spline Wall Systems: USG H-Splines, SHEETROCK brand Gypsum Liner Panels.
- Q** Drywall Screws:
size: (3/8")(5/16")(1/2")(1")(1 1/4")(1 1/2")(1 3/4")(2")(2 1/4")(2 1/2")(3")style: (framing—Type S or S-12)(drywall—Type S) (self-drilling—Type S-12)(laminating—Type G) (coarse thread—Type W)head: (bugle)(pan)(trim)(pancake)(low-profile) (mod. truss head) coating: (reg)(corrosion-resistant)
- R** Drywall Nails: (length) (type) (conforming with ASTM C514) (as specified in fire-resistive construction).
- S** Drywall Adhesives: (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound 210 or 90) (SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed).
- T** Joint Treatment: SHEETROCK Joint Tape. SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound (20, 45, 90, 210, 300). SHEETROCK Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound (AP LITE). SHEETROCK Ready-Mixed Joint Compound (Taping, Topping, All Purpose). SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3).
- U** Prime Coat: SHEETROCK First Coat.
- V** Sealant: SHEETROCK Acoustical Sealant.
- W** Firestop: FIRECODE Compound.
- X** Concrete Finishing Compound: (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound) (COVER COAT Compound) (as ready-mixed) (with sand additive).
- Y** Cavity Shaft Wall Materials: SHEETROCK brand Gypsum Liner Panels, USG Steel J-Runners (style), USG Steel C-H Studs (style), USG Steel E-Studs (style), USG Steel Jamb Struts (style).
- Z** Cavity-Type Area Separation Wall Materials: SHEETROCK brand Gypsum Liner Panels, USG Steel CR-Runners (style), USG Steel C-H Studs and E-Studs (style), USG Aluminum Breakaway Clip. Solid-Type Area Separation Wall Materials: SHEETROCK brand Gypsum Liner Panels, USG Steel CR-Runners (style), USG Steel H-Studs (style), USG Aluminum Breakaway Clip.

Part 3: Execution

3.1 Gypsum Panel Application

3.1.1 Basic Single-Layer System, Treated Joints

- A** Position all ends and edges of all gypsum panels over framing members, except when joints are at right angles to framing members as in perpendicular application or when end joints are backblocked.
- B** Apply gypsum panels first to the ceiling and then to the walls.

Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

- C** Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive Application) (Double Nailing Method) (Power-driven Screws). Space fasteners not less than $\frac{3}{8}$ " from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.
- D** Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner. Gypsum board should be cut to size utilizing a knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device.
- E** Install trim at all internal and external angles formed by the intersection of either panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions. (Multi-layer systems: see pertinent United States Gypsum Company System Folders).

3.1.2 SHEETROCK brand Gypsum Panels, Water-Resistant—(see United States Gypsum Company Folder SA-924.)

3.1.3 Lamination of Gypsum Panels to Interior Monolithic Concrete and Unit Masonry

- A** The masonry or concrete shall be clean, smooth and dry prior to application. If wood base is to be used, attach wood nailer to wall before lamination is started.
- B** Cut face panels to allow continuous clearance ($\frac{1}{8}$ " to $\frac{1}{4}$ ") at floor. Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or SHEETROCK All Purpose or Taping Joint Compound Ready-Mixed at center and near each panel edge in strips consisting of 4 beads, $\frac{3}{8}$ " wide x $\frac{1}{2}$ " high and spaced $1\frac{1}{2}$ " to 2" o.c. Position panels vertically over wall surface, press into place and provide temporary support until adhesive is hardened.
- C** Install trim at all intersections of panel surfaces with other surfaces.
- D** Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended.

3.2 RC-1 Resilient Channel Erection

(See specifications in Systems Folders SA-921, SA-923 and SA-924).

3.3 Steel Stud and Runner Erection

(See specifications in Systems Folder SA-923).

3.4 Metal Furring Channel Erection

(See specifications in Systems Folder SA-923).

3.5 USG High Performance Floor/Ceiling Erection

(See specifications in Systems Folder SA-924).

3.6 USG Area Separation Wall Erection

(See specifications in Systems Folder SA-925).

3.7 USG Cavity Shaft Wall Erection

(See specifications in Systems Folder SA-926).

3.8 USG High Attenuation Double Wall Erection

(See specifications in Systems Folder SA-921).

3.9 Control Joint Installation

Attach SHEETROCK Zinc Control Joint No. 093 with Bostitch $\frac{5}{8}$ " "G" staples or equal spaced not over 6" apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.10 Fastener and Adhesive Application

3.10.1 Drywall Screws

Power-drive with an electric screwdriver so screwheads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than $\frac{3}{8}$ " from edges and ends of gypsum panels.

3.10.2 Nails

Drive nails with heads slightly below gypsum panel surface in a uniform dimple $\frac{1}{32}$ " deep formed by crowned face of hammer. Drive nails no closer than $\frac{3}{8}$ " from edges and ends of panel.

3.10.3 Adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

- A** Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to insure adequate bond.
- B** Apply stud adhesive in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16" o.c. around perimeter of panel, $\frac{3}{8}$ " away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels pre-bowed and applied vertically, use permanent fasteners only at top and bottom of panel.
- C** Apply laminating adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four $\frac{1}{4}$ "x $\frac{1}{4}$ " minimum notches spaced max. of 2" o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to insure bond; press again within 24 hr. if necessary.
- D** Apply liquid contact adhesive with a short nap paint roller to cover both contact surfaces according to adhesive manufacturer's directions. Let adhesive air dry to the touch. Apply panels as soon as possible after drying occurs. On walls, fasten 16" o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of panel, and along edges spaced max. 48" o.c. Press panel into place with firm pressure to insure bond.
- E** Apply construction adhesive in continuous $\frac{3}{8}$ " beads to framing. On walls, apply a continuous adhesive bead to center of studs to within 6" of board perimeter. At panel joints, apply two adhesive beads—one at a time—as each panel is installed. Do not apply adhesive at inside corners or to top and bottom plates, bridging, bracing and fire stops. Apply no more adhesive than can be covered in 15 min. Set panel in place, fasten 16" o.c. along top and bottom of panel and impact by hand along stud.

3.11 Pre-Fill Application

- A** Mix SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- B** Pre-fill all "V"-grooves formed by abutting tapered eased edges of SHEETROCK brand Gypsum Panels, SW Edge, with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY

SAND) Joint Compound using a flexible 5" or 6" joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.12 Joint Treatment Application

- A** Mix joint compound in strict accordance with manufacturer's recommendations.
- B** Apply joint compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply joint tape centered over joint and seated into compound. Sufficient compound—approx. $\frac{1}{4}$ " to $\frac{1}{2}$ "—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds need only have hardened prior to application of next coat.)
- C** Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out at least 2" beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds need only have hardened prior to second coat application.)
- D** Spread finish coat evenly over and extend at least 2" beyond second coat on all joints and feather to a smooth uniform finish. Do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand lightly between coats and following the final application of compound to provide a smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.13 Finishing Fasteners

Apply a setting-type, or all purpose or lightweight all-purpose compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the surface. (Exception: Setting-type and lightweight all purpose joint compounds.)

3.14 Finishing Beads and Trims

- A** Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat. (Exception: SHEETROCK Setting-Type (DURABOND) and Lightweight Setting-Type (EASY SAND) Joint Compounds need only have hardened prior to application of next coat.)
- B** Apply second coat in same manner as first coat, extending compound slightly beyond face of panel. Compound must be thoroughly dry prior to application of finish coat.
- C** Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane or surface. (Exception: Only two coats of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound or SHEETROCK Lightweight All Purpose Joint Compound Ready-Mixed (PLUS 3) are needed). Sand finish as necessary to provide a flat smooth surface ready for decoration. When sanding take care not to roughen face paper.

3.15 Exterior Joint System Application

- A** Mix SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.
- B** Pre-fill joints of SHEETROCK brand Exterior Gypsum Ceiling Board with SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. After pre-fill has hardened, embed SHEETROCK Joint Tape centered over joint. When compound has hardened, immediately apply fill coat.
- C** Apply SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound over flanges of SHEETROCK Zinc Control Joints, metal beads and trim. Spot fastener heads.
- D** After fill coat has hardened, apply finishing coat of SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: After SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint over entire surface.

3.16 Filling and Finishing Interior Concrete

- A** Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-inhibitive primer and allowed to dry.
- B** Fill offsets and voids with a SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound.
- C** Mix (COVER COAT Compound) (SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound) according to manufacturer's directions and apply to concrete (ceilings) (columns) before interior partitions are erected. Coordinate application of SHEETROCK No. 800 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of compound 3" to 4" wide. Apply sufficient coats to obtain a smooth surface. If SHEETROCK Setting-Type Joint Compound (DURABOND) is used, and if an easier-sanding surface is desired, then apply a skim coat of COVER COAT Compound over entire surface. After compound has dried, sand to a smooth surface suitable for decoration.

Trademarks: The following trademarks used herein are owned by USG Corporation or a related company: USG, SHEETROCK, FIRECODE, TEXTONE, PLUS 3, DUROCK, THERMAFIBER, DUR-A-BEAD, ULTRACODE, AP LITE, EASY SAND, COVER COAT, RC-1, GYP-LAP, UNIMAST, DRILLERS and SUPER-TITE are trademarks of Unimast Incorporated. Type S, S-12 and TRAXX are trademarks of ITW Buildex.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Sales Offices: **Arizona** - Phoenix, (602) 866-0795; **California** - Fremont, (415) 792-4400, Glendale, (818) 956-1882; **Florida** - Jacksonville, (904) 764-3293, Miami, (305) 557-4501; **Georgia** - Atlanta, (404) 393-0770; **Hawaii** - Honolulu, (808) 538-7712; **Illinois** - Chicago, (312) 606-5845; **Indiana** - Indianapolis, (317) 848-1513; **Louisiana** - New Orleans, (504) 241-2020; **Maryland** - Baltimore, (301) 355-2200; **Massachusetts** - Charlestown, (617) 241-8530; **Michigan** - Southfield, (313) 569-1900; **Minnesota** - Bloomington, (612) 854-4233; **Missouri** - St. Louis, (314) 349-0980; **New York** - Albany, (518) 458-7437, Oakfield, (716) 948-5287, Stony Point, (914) 786-2820; **North Carolina** - Charlotte, (704) 552-7402; **Ohio** - Chesterland, (216) 729-1956; **Oregon** - Beaverton, (503) 626-8864; **Pennsylvania** - Pittsburgh, (412) 341-2434; **Tennessee** - Nashville, (615) 361-8419; **Texas** - Dallas, (214) 490-0771, Houston, (713) 666-0751; **Utah** - Salt Lake City, (801) 266-4975; **Virginia** - Richmond, (804) 285-7528; **International Division:** Chicago, (312) 606-5840.

United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

TEXTONE **Vinyl-Faced Gypsum Panels**



TEXTONE Vinyl-Faced Gypsum Panels and mouldings provide economical and permanent partitions that offer faster room completion and lower in-place cost than field-applied vinyl when used with conventional drywall framing systems or in combination with relocatable wall systems from USG Interiors. There's no mess—no joint compounds, no taping. No schedule delays either. The durable vinyl finish continues to look new with routine soapy water cleaning—reducing or eliminating redecorating costs.

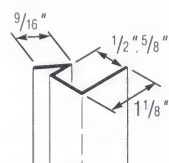
Regular panels are 1/2" thick, 4' wide and 8', 9' and 10' long. May be special ordered in 3/8" and 5/8" thicknesses, 2' widths and custom lengths from 6' to 14'. FIRECODE Core Panels come in 1/2" and 3/8" thicknesses, 4' wide. TEXTONE Regular and FIRECODE Core Panels meet ASTM C960.

Mouldings

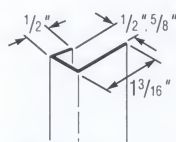
A complete line of surface mouldings provide the finishing touch on edges, corners and trim around openings. Mouldings are precision extruded from rigid plastic and are available plain (RP) in standard Almond or Ash Blue colors or factory laminated with matching TEXTONE Vinyl (RPV). Mouldings are easy to cut and mitre on the job. Included are: inside corner, end cap, snap-on corner, snap-on batten, ceiling/drive-in trim. For actual moulding samples, ask your United States Gypsum Company representative for Accessory Sample WB-1836.

Mouldings should be installed with appropriate drywall mechanical fasteners listed in Part 2: Products, Section 2.5 (Fasteners).

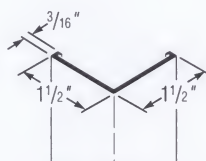
- **RP-2 and RPV-2 Inside Corner**—Install first panel so that vertical edge aligns with framing. Apply moulding over first panel, fastening exposed flange to framing. Insert opposite panel into moulding.
- **RP-4 and RPV-4 End Cap**—Align and fasten end cap to framing. Insert panel into moulding, apply panel to wall.
- **RP-5 and RPV-5 Snap-on Corner**—Apply panels using adhesive or adhesive/nail-on application. Place retainer strip over corner, fasten with nails or screws driven through holes provided and snap corner face onto retainer strip.
- **RP-7 and RPV-7 Snap-on Batten**—Apply panels using adhesive or adhesive/nail-on application. Place retainer strip over joint, fasten with nails or screws driven through holes provided and snap batten face onto retainer strip.



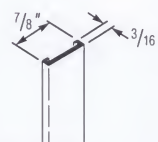
RP-2, RPV-2
Inside Corner



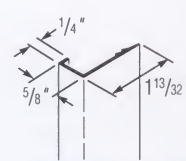
RP-4, RPV-4
End Cap



RP-5, RPV-5
Snap-On Corner



RP-7, RPV-7
Snap-On Batten



RP-46, RPV-46 Ceiling
Drive-In Trim

Load-Bearing Partitions/Test Data

Fire rating	Fire-rated construction		Acoustical performance		System reference
	Detail & physical data	Description & test no.	STC	Description & test no.	
1 hr.		Wood stud—1/2" TEXTONE vinyl-faced gypsum panels—2x4 24" o.c.—panels nailed 7" o.c. with 3/8" adhesive bead on intermediate studs—joints fin—FM WP90	39	GA-G&H NG-246FT	A
1 hr.		Steel stud—1/2" TEXTONE vinyl-faced gypsum panels, FIRECODE core—2 1/2" steel studs 24" o.c. with 7/8" steel tracks att to each stud with 1 1/2" Type S screw—aluminum battens over tracks—UL Des U405 wt 7 width 3 3/4"	45	G&H NG-146FT Based on 3" insulation.	B

- **RP-46 and RPV-46 Ceiling Drive-in Trim**—Install after panels are applied. Insert grooved flange between runner and ceiling; tap trim into place. Adhesive may be required to secure trim.

Matching Wall Covering

Cotton sheet-backed TEXTONE Vinyl Wallcovering is available for field installation. Most wallcoverings weigh 1.2 to 1.4 oz./sq. yd. and come in 54" x 30 yd. rolls.

Panel surface burning characteristics⁽¹⁾ and vapor permeance⁽²⁾

TEXTONE Pattern	Film Thickness or Weight	Flame Spread	Smoke Dev.	Vapor Perm.
Pumice	6 mils	20	25	0.8
Suede	6 mils	15	25	0.6
Presidio	6 mils	15	25	0.6
Granite	6 mils	15	25	0.6
Woodgrain	6 mils	20	15	0.6
Linen	8 mils	15	25	0.5
Country Weave	10 mils	20	35	0.8
Textile (Type I, Fabric-Backed) ⁽³⁾	10.7 oz./yd ²	25	65	1.0
Brittany (Type I, Fabric-Backed) ⁽³⁾	10.0 oz./yd ²	25	55	2.1

(1) Tested in accordance with ASTM E84-80.

(2) Tested in accordance with ASTM E96-90.

(3) Comply with Federal Specification CCC-2-408C, Type I.

Limitations

- 1 For adhesive application of TEXTONE Vinyl-Faced Gypsum Panels, only water-thinned adhesives are recommended. Other adhesives may not be compatible and could result in delamination and discoloration of vinyl surfaces.
- 2 If TEXTONE Vinyl-Faced Gypsum Panels, FIRECODE Core, are used in a fire-rated assembly instead of a non-vinyl-faced product such as SHEETROCK brand Gypsum Panels, FIRECODE Core, the applicable fire test must permit exposed joints or battens.
- 3 Not recommended for use over foil-back panels or other vapor retarder in exterior walls.
- 4 Avoid exposure to excessive or continuous moisture and extreme temperatures.
- 5 Do not apply on exterior walls in hot, humid climates without suitable vapor control or dry air circulation behind the panels.

Range A

Pumice



Pearl (66) Vanilla (66) Bright Beige (66) Stone (68)

TEXTONE Vinyl-Faced Gypsum Panels are available in 38 vinyl finishes, factory-applied. For actual samples, see swatchbook WB-1835.

The vinyl finishes below are organized by price range, with Range A lowest and Range E highest. Average light reflectance values are in parenthesis after finish names.

Range B

Suede



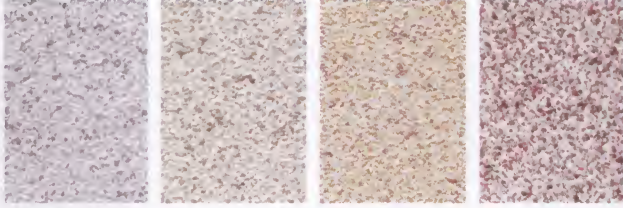
Old Ivory (61) Summer Shore (48) White Frost (64)

Presidio



Reed (78) Linear (78) Island (78)

Granite



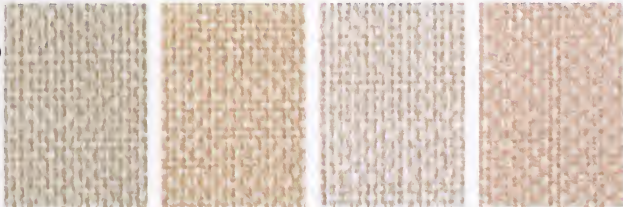
Chalk Blue (63) Olive Stone (63) Woodland (63) Tapestry (63)

Woodgrain



Natural Pecan (15)

Linen



Pewter (56) Straw (56) Champagne (60) Basket (58)

Country Weave



Cream (58) Beach (58) Wicker (45)

Range C

Textile



Scroll (71) Chalk (50) Mist White (63)

Range E

Brittany



Mauve (31) Bluebrook (44) Natural (58) Dove Gray (45)

These photos show the actual vinyl laminated to gypsum panels. Slight color differences may exist between the printed colors shown and the actual product colors. Refer to swatchbook WB-1835 for vinyl samples.

Good Design Practices

- 1 For fire-rated assemblies**—refer to application requirements of the specific system tested. Mechanical fastening is usually required along with a specific type of adhesive.
- 2 Adhesives**—for more complete details and application using adhesives, see Gypsum Panels and Accessories Folder SA-927 in this series and manufacturer's directions.
- 3 Additional information**—refer to TEXTONE Vinyl-Faced Gypsum Panels Installation & Maintenance/Technical Data, WB-1330, and TEXTONE Decorative Mouldings, WB-1385.

Architectural Specifications

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and installed by workers experienced in this trade.

1.3 Delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental conditions

In cold weather the building shall be heated and ventilated during application of gypsum vinyl-faced panels to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: Products

2.1 Gypsum vinyl-faced panels

TEXTONE (type)(pattern and color)(thickness and size)(core formulation).

2.2 Mouldings and trim

(type) TEXTONE Mouldings, (pattern and color)(thickness and size).

2.3 Adhesives

(SHEETROCK Setting Type Joint Compound-DURABOND 210 or 90)(SHEETROCK Taping or All Purpose Joint Compound Ready-Mixed). Specify from Gypsum Panels and Accessories Folder, SA-927.

2.4 Fasteners

- A** Coordinated color nails (color)(length). Specify: 1 $\frac{1}{8}$ " for single layer, 1 $\frac{1}{2}$ " for double layer.
- B** Type S Screws (length). Specify: 1" for single layer, 1 $\frac{1}{2}$ " for double layer.
- C** Vinyl Foam Tape: 1 $\frac{1}{2}$ " wide min., $\frac{1}{32}$ " to $\frac{1}{16}$ " thick. Specify to eliminate mechanical fasteners or temporary bracing and for temporary attachment of adhesively applied panels until adhesive attains maximum bonding strength.

2.5 Fasteners (mouldings and trim)

- A** Screws—(1" Type S Bugle Head)(1 $\frac{1}{4}$ " Type W Bugle Head).
- B** Nails—obtain locally—($\frac{1}{2}$ " x 18 Flat-Head Wire)(1 $\frac{1}{4}$ " Annular Ring Drywall).

Part 3: Execution

3.1 TEXTONE Vinyl-Faced Gypsum Panels—wood or steel studs

Apply 8" long strip of vinyl foam tape to face of each stud, positioned at midpoint of studs up to 8' long, at third-points on studs up to 12' long and quarter-points on studs over 12'. Where no mechanical fasteners are to be used at top or bottom of stud, apply an 8" long strip of tape on the track or wood plate at each

stud. Apply a continuous $\frac{3}{8}$ " bead of drywall stud adhesive to the entire face of studs between vinyl foam tape. Immediately apply TEXTONE Vinyl-Faced Gypsum Panels vertically and apply sufficient pressure to insure complete contact with both tape and adhesive. Where use of color-matching TEXTONE nails is desired along ends and edges of board and in conjunction with drywall stud adhesive, drive nails with plastic-headed hammer or raw-hide mallet. Space nails at least $\frac{3}{8}$ " from ends and edges and 8" o.c.

3.2 TEXTONE Vinyl-Faced Gypsum Panels—base layer of gypsum panels

Apply liquid contact adhesive to back of TEXTONE Vinyl-Faced Gypsum Panels and face of base layer according to adhesive manufacturer's directions. Allow adhesive to air dry, then bring panels into contact. Apply pressure to entire surface to assure complete contact.

3.3 TEXTONE Vinyl-Faced Gypsum Panels—base layer of masonry, gypsum panels, wood or mineral fiber board

For interior masonry walls and gypsum board, apply continuous strips of vinyl foam tape to entire width of TEXTONE Vinyl-Faced Gypsum Panel back at midpoint and $\frac{3}{8}$ " from each end. Spread laminating adhesive over entire area of panels between tape using notched metal spreader with $\frac{1}{4}$ " x $\frac{1}{4}$ " notches spaced 2" o.c. Position panel and immediately apply sufficient pressure to assure complete contact over entire surface. (Mechanical fasteners may be substituted for tape at ends of panels.)

For application of TEXTONE Vinyl-Faced Gypsum Panels to wood or mineral board, pre-bow panels and apply laminating adhesive over entire back surface.

3.4 TEXTONE Mouldings

Finish panel joints, edges and corners with either plain TEXTONE Mouldings or mouldings to match specified panel finishes and install mouldings with fasteners 8" to 12" o.c. For snap-on mouldings, fasten through holes in the retainer clip which is included with the snap-on moulding.

Trademarks—The following trademarks used herein are owned by United States Gypsum Company or a related company: FIRECODE, SHEETROCK, TEXTONE.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

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United States Gypsum Company

101 South Wacker Drive

Chicago, Illinois 60606-4385

A Subsidiary of USG Corporation

DUROCK Interior Cement Board Systems



Interior systems for a variety of applications:

- Tile backer for walls, ceilings and floors.
- 32", 36", 48" panel widths.
- $\frac{5}{16}$ " x 4' x 4' DUROCK Underlayment for floors and counter tops.
- Wall shield and floor protector for room heaters and stoves.
- New $\frac{1}{2}$ " x 32" x 8' DUROCK RB for interior and exterior.

USG

DUROCK Interior Cement Board offers architects, builders and tile contractors a strong, water-damage resistant tile base for tub and shower areas. Also an ideal underlayment for tile on floors and counter tops in new construction and remodeling. Board is readily applied over wood or steel framing spaced 16" o.c. with DUROCK Wood or Steel Screws or galvanized roofing nails. After joints are treated, ceramic wall or floor tile are applied using latex fortified mortar or Type I organic adhesive.

The 1/2" thick DUROCK Boards are listed by Underwriters Laboratories, Inc., for use with UL-listed solid-fuel room heaters and fireplace stoves. Used as a wall shield, board reduces by two-thirds the manufacturer-specified clearance (minimum 12") between room heater or stove and combustible wall surface. Board may also be used as a floor protector in place of one layer of 3/8" thick millboard. For hearth extensions see Specification 3.6B on page 8.

DUROCK Cement Board is formed in a continuous process of aggregated portland cement slurry and reinforced with polymer-coated, glass-fiber mesh embedded in both surfaces. Standard interior boards are produced to 1/2" thickness, cut to size and cured. Ends are square cut and edges are reinforced and formed smooth. Smooth wrapped edge is patented—No. 4,916,004.

In addition to standard 1/2" DUROCK Interior Cement Board, DUROCK Underlayment is available for floors and counter tops. Its nominal 3/8" thickness helps eliminate transition trim when abutting carpet or wood flooring and helps minimize level variations with other finish materials. Its 4'x4' size is easy to handle and helps cut down on waste. Applies directly over old substrate on counter tops to save time.

Also available is 1/2" thick, 32" wide DUROCK RB, a cement board designed for DUROCK interior and exterior system applications not exceeding a uniform load of 30 psf. Lower cost DUROCK RB meets the design needs for most low-rise construction. To reduce board joints, 1/2" thick 4'x8' DUROCK Interior or Exterior Cement Board is preferred by many applicators.

Features and Benefits

High performance—DUROCK Cement Board possesses the flexural and compressive strength, hardness and impact resistance needed for a tile base.

Smooth or textured—Board is smooth on one side for mastic applications, textured on other side for mortar applications. Textured surface enhances bonding and reduces tile slip.

Dimensionally stable—Board is rigid and exhibits excellent water-damage resistance properties as a permanent tile base. It will not swell, soften, decay, delaminate or disintegrate.

Fire-resistant—Assemblies with 1/2" DUROCK Cement Board have achieved 1- and 2-hr. fire-resistance ratings. Surface burning characteristics for DUROCK Cement Board: flame spread 5, smoke developed 0.

Lighter weight—At approximately 3 psf, the 1/2" thick tile backer weighs only one-fourth the weight of a 1" thick metal lath and cement plaster bed.

Easy installation—DUROCK Cement Board is easy to cut and fasten with DUROCK Screws or galvanized roofing nails. Simple dry panel application eliminates cement mixing and drying time, shortening job schedules and lowering in-place cost.

Sound control—Sound isolation ratings up to 65 STC are offered with steel-framed partitions.

Convenient sizes—DUROCK Interior Cement Board may be ordered in sizes to meet job requirements. A 3/8" thickness, custom lengths from 32" to 96", and 32" or 48" widths are available.

Versatile application—DUROCK Cement Board provides a smooth, sound base for glass and ceramic mosaics; ceramic and quarry tile; lugged tile; thin stone tile and thin brick. Suitable for application to wood or steel framing spaced 16" o.c. in new construction and in remodeling. Board is ideal for use in interior partitions, walls, floors and ceilings in wet or dry areas. It is highly durable in high-moisture areas found in baths, showers, kitchens and laundry rooms.

Limitations

- 1 DUROCK Interior Cement Board and DUROCK Underlayment are only for interior construction. (See SA-700 DUROCK Exterior Cement Board Systems for information on exterior applications featuring DUROCK Exterior Cement Board and DUROCK RB.)
- 2 Maximum stud spacing: 16" o.c. (24" o.c. for cavity shaft wall assembly); maximum allowable deflection, based on stud properties only, L/360. Maximum fastener spacing: 8" o.c. for wood and steel framing; 6" o.c. for ceiling applications.
- 3 Maximum dead load for ceiling system is 7.5 psf.
- 4 Steel framing must be 20 ga. or heavier.
- 5 Do not use drywall screws or drywall nails.

Product Data

Material: Aggregated portland cement board with polymer-coated, glass-fiber mesh completely encompassing edges, back and front surfaces.

Sizes and Packaging

Type	Thickness		Width		Length		Ship. Units
	Standard	Custom ⁽¹⁾	Standard	Custom ⁽¹⁾	Standard	Custom ⁽¹⁾	
Interior	1/2"	3/8"	32", 36"	48"	5'	3' to 8'	40
Underlayment	3/8"	—	48"	—	4'	4' to 8'	40
RB	1/2"	—	32"	—	8'	4' to 8'	30
Exterior	1/2"	3/8"	48"	32"	8'	4' to 10'	20

(1) Minimum quantity required for custom sizes.

(2) Stretch-wrapped and shipped in packaging units as shown.

Edges: Formed smooth. **Ends:** Square cut.

Building Code Data

See National Evaluation Service Report Nos. 259 and 396 for allowable values and/or conditions of use concerning material presented in this document. These reports are subject to reexamination, revisions and possible changes.

Standards

DUROCK Interior Cement Board exceeds the ANSI Standards for cementitious backer units. See ANSI A118.9-1990 for Test Methods and Specifications for CBU and ANSI 108.11-1990 for Interior Installation of CBU.



LISTED 34L2

For floor protectors and wall shields.

Typical physical properties


Property	ASTM Test reference	1/2" board value	3/8" underlayment value
Flexural strength—psi	C947	750	1250
Indentation strength—psi 1" dia. disc @ 0.02" indent.	D2394	2300	2300
Nail pull resistance—lb	C473	125	—
Weight—psf	C473	3	2
Surface burning characteristics—flame/smoke	E84	5/0	5/0
Thermal "R"/k value	C177	0.26/1.92	—
Standard method for evaluating ceramic floor tile installation systems	C627	Residential	Residential

1-Hour Partitions

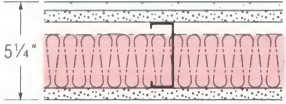
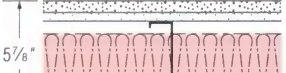
Wood-Framed/Load Bearing

RC-1™ Resilient Channel

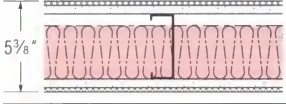
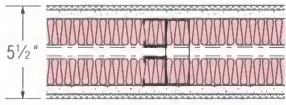
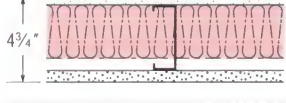
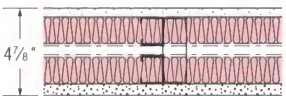
Thermafiber Insulation

Detail/Physical Data	Description	Fire Test	STC	Sound Test	Reference
	1/2" DUROCK interior cement board and 1/4" ceramic tile—2x4 16" o.c.—3 1/2" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws or 1 1/2" galv nails 8" o.c.—joints taped—alt. design 3/8" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U329	37 40	USG-840404 Based on alt. design— USG-840314	A

Steel-Framed/Load Bearing

	1/2" DUROCK interior cement board—base layer 3/8" SHEETROCK brand gypsum panels, FIRECODE core—3/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped	UL Des U473	N/A		B
	3/8" SHEETROCK brand gypsum panels, FIRECODE core, att with 1 1/2" screws 8" o.c. at edges, 12" o.c. in field—base layer 1/2" DUROCK interior cement board—board att with 1 1/2" DUROCK screws 24" o.c.—3/8" studs 16" o.c.—3" THERMAFIBER SAFB	UL Des U485	N/A		C

Steel-Framed/Non-Load Bearing

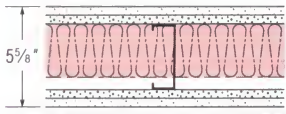
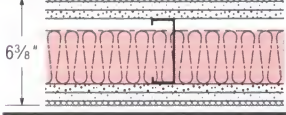
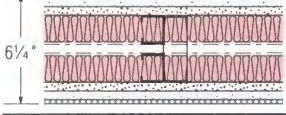
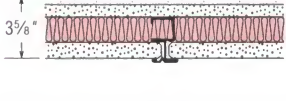
	1/2" DUROCK interior cement board and 1/4" ceramic tile—3/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 3/8" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U442	51 53	SA-840321 Based on alt. design— SA-840313	D
	Plumbing Chase Wall—1/2" DUROCK interior cement board and 1/4" ceramic tile—1" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 3/8" SHEETROCK brand gypsum panels, FIRECODE core, one side	UL Des U445	61 60	Based on 3" SAFB & 3/8" studs—SA-840524 Based on 3" SAFB & alt. design—SA-840515	E
	1/2" DUROCK interior cement board—3/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped and treated—3/8" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U457	50	Based on 3/8" SHEETROCK brand gypsum panels, FIRECODE core—USG-840222	F
	Plumbing Chase Wall—1/2" DUROCK interior cement board—1" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—3/8" SHEETROCK brand gypsum panels, FIRECODE C core	UL Des U458	57	Based on 3/8" studs & 3" SAFB—SA-840505	G

2-Hour Partitions

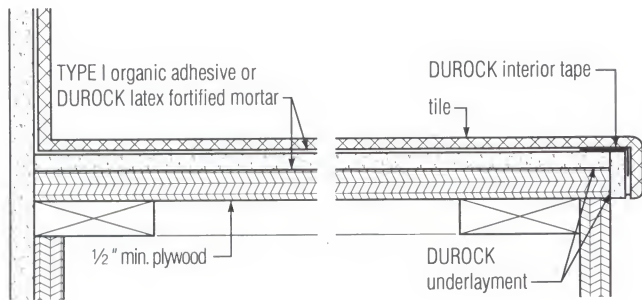
Wood-Framed/Load Bearing

	Plumbing Chase Wall—1/2" DUROCK interior cement board and 1/4" ceramic tile—2 rows 2x4 16" o.c. on 2x8 com plate—3 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws or 1 1/2" galv. nails 8" o.c.—joints taped	WHI-495-0505 & 0508	50 load bearing up to 50% allowable design load	SA-840523	H
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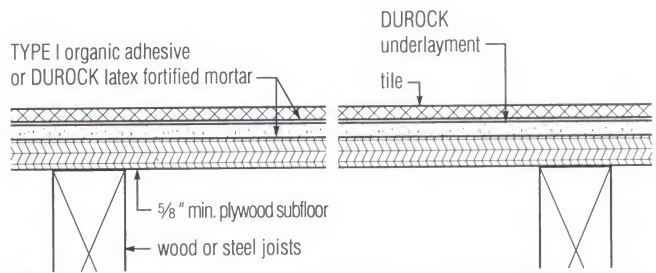
Steel-Framed/Non-Load Bearing

	1/2" DUROCK interior cement board—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, both sides—3/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design double layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, on one side	UL Des U474	N/A		I
	2 layer—1/2" DUROCK interior cement board and 1/4" ceramic tile—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—3/8" studs 16" o.c.—3" THERMAFIBER SAFB—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side	UL Des U443	61 59	SA-851028 Based on alt. design— SA-851016	J
	Plumbing Chase Wall—2 layer—1/2" DUROCK interior cement board and 1/4" ceramic tile—base layer 1/2" SHEETROCK brand gypsum panels, FIRECODE C core—1" studs 16" o.c. in two rows with horiz braces—1 1/2" THERMAFIBER SAFB in both stud cavities—board att with 1 1/2" DUROCK screws 8" o.c.—joints taped—alt. design 2 layers 1/2" SHEETROCK brand gypsum panels, FIRECODE C core, one side	UL Des U444	65 62	SA-851112 Based on alt. design— SA-851102	K
	Cavity Shaft Wall—1/2" DUROCK interior cement board—3/8" SHEETROCK brand gypsum panels, FIRECODE core—1" SHEETROCK brand gypsum liner panels set betw USG steel 20-ga. min C-H studs 24" o.c.—1 1/2" THERMAFIBER SAFB—cement board screw att with 1 1/2" DUROCK screws 8" o.c. & laminated to gypsum panel with 4" strip ceramic tile mastic applied with 1/4" notched trowel midway betw studs—joints fin	UL Des U459	N/A		L

Counter tops

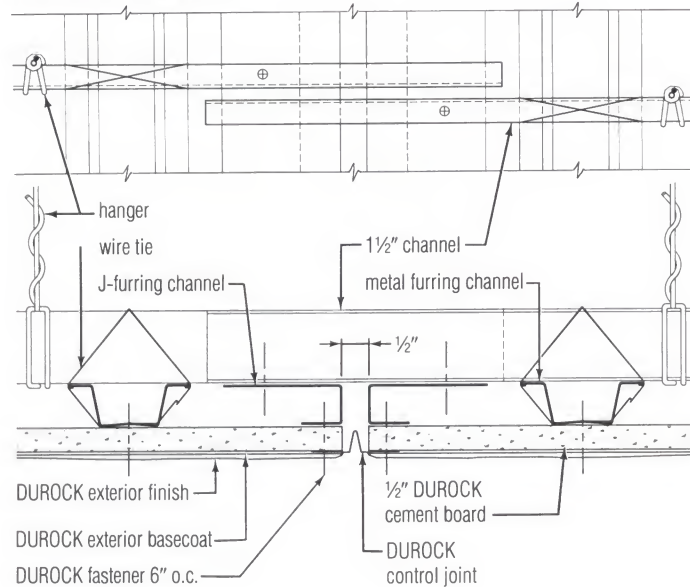


Floors, interior-wood or steel joists

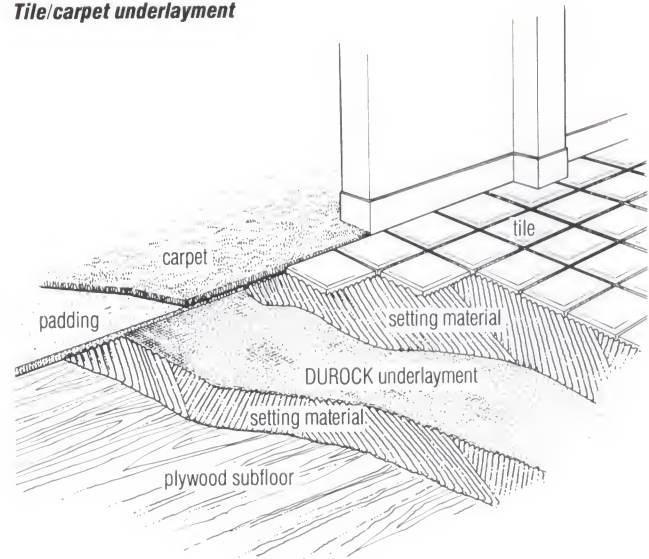


Note: For floor and counter top applications, use latex fortified mortar for heavy tiles, such as quarry, pavers, button-back and floor tiles over 6" x 6" size.

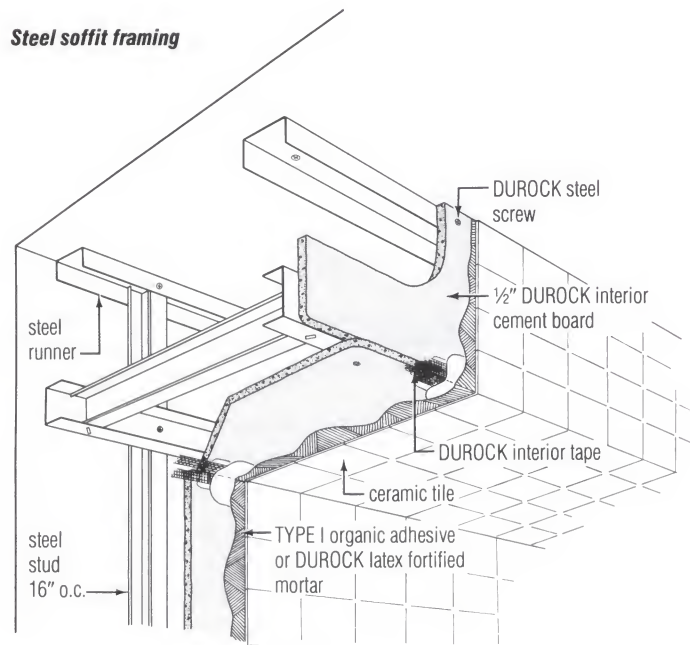
Suspended ceiling detail



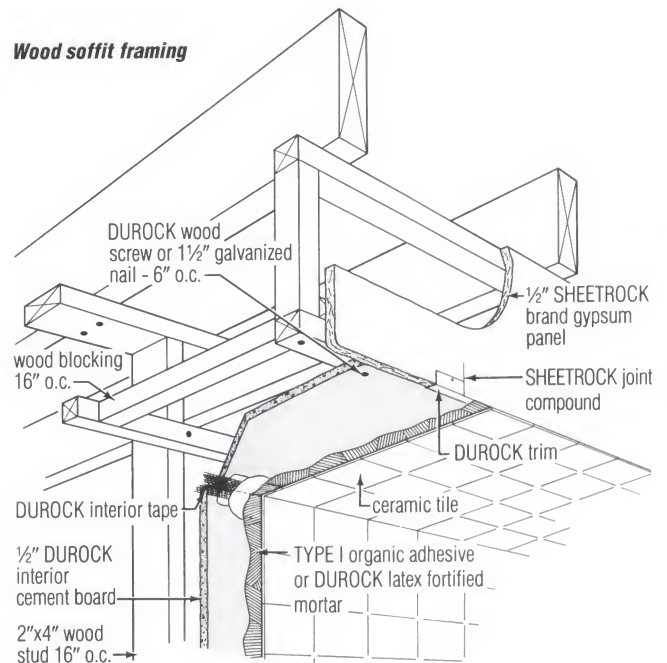
Tile/carpet underlayment

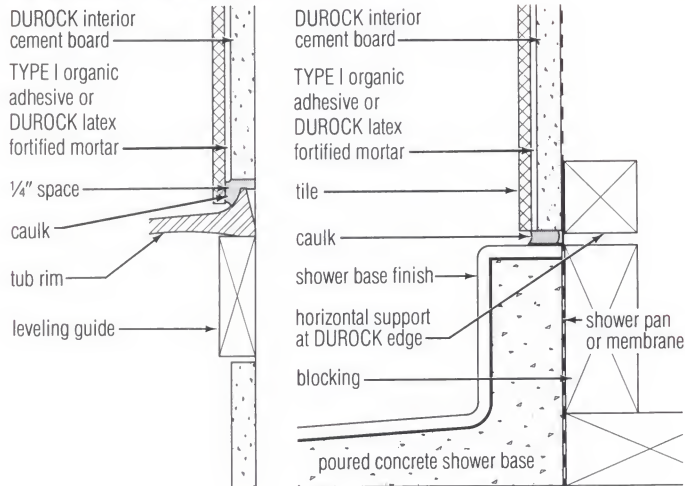
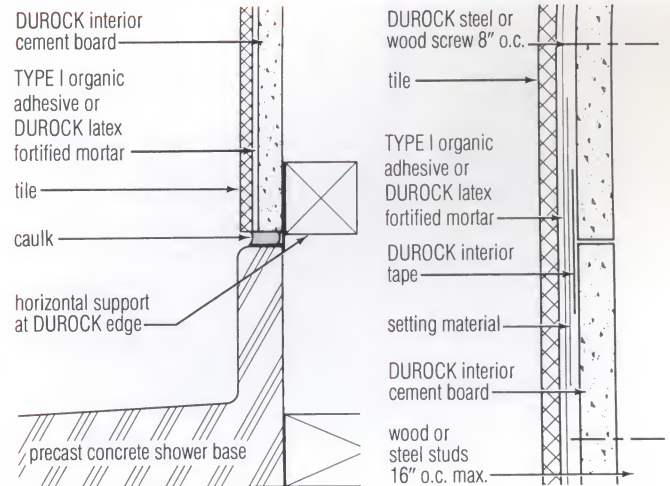


Steel soffit framing



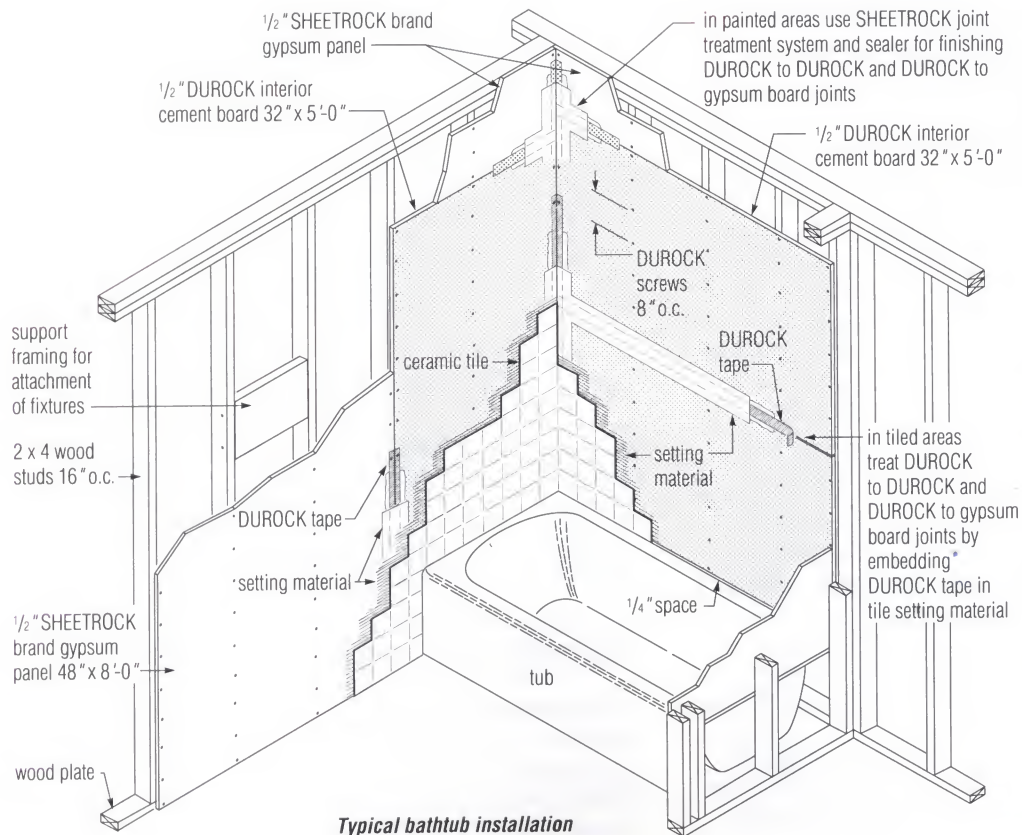
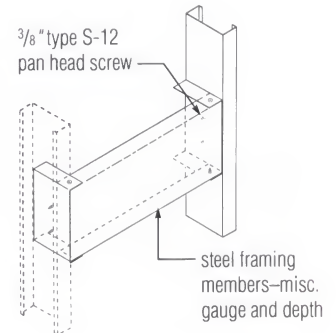
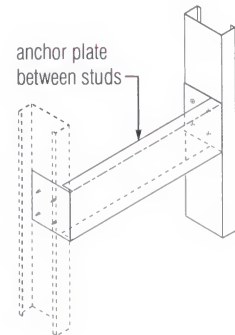
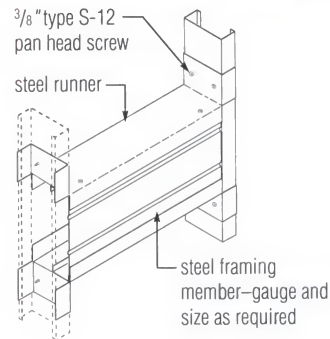
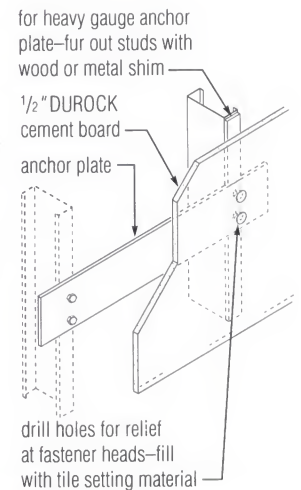
Wood soffit framing



Tub and shower - single layer board**Walls, interior - wood or steel studs****Fixture Attachment Load Table**

Fastener	Size		Base assembly	Allowable withdrawal resistance		Allowable shear resistance	
	in	mm		lb	N ⁽¹⁾	lb	N ⁽¹⁾
toggle bolt or hollow wall anchor	3/8	3.18	1/2" cement board & steel stud	70	311	100	445
	1/2	4.76		80	356	125	556
	3/4	6.35		155	689	175	778
Type S-12 pan head screw	3/8	9.5	20-ga. steel to 20-ga. steel	53	236	133	680
two bolts welded to steel insert	3/8	4.76	see grab bar attachment in SA-923	175	778	200	890
	1/2	6.35		200	890	250	1112
bolt welded to 1 1/2" chan.	1/2	6.35	see plumber's bracket in SA-923	200	890	250	1112

(1) Newtons

Fixture attachment - steel framing**Typical bathtub installation**

abuts a structural element or dissimilar wall or ceiling; (b) construction changes within the plane of the wall; (c) interior surfaces exceed 16' in either direction. Surface control joint width should comply with architectural practices. See SA-700 for details.

Location of building control joints must be detailed by the architect. Steel framing at building control joints that extend through the wall (with top and bottom runner tracks broken) should have 1½" cold-rolled channel alignment stabilizers spaced a maximum of 5'0" o.c. vertically. Channels should be placed through holes in the stud web of the first two adjacent studs on both sides of the joint and securely attached to the first adjacent stud on either side of the joint.

Cement board should be separated at all surface and building control joints. Where vertical and horizontal joints intersect, the vertical joint should be continuous and the horizontal joint should abut it. Splices, terminals and intersections should be caulked with a sealant complying with architectural practices and sealant manufacturer recommendations.

- 3 Special Size Considerations**—In large wall areas where it is desirable to minimize the number of joints or where other design considerations dictate the use of a longer or wider board, order custom size DUROCK Interior or Exterior Cement Board, ½" thick, 48" wide, 8' to 10' long.
- 4 Water Barrier**—DUROCK Interior Cement Board is vapor permeable but provides resistance to water penetration. If a vapor retarder or waterproof construction is specified, a separate barrier must be applied over or behind the DUROCK Board.
- 5 Swimming Pool Enclosures**—DUROCK Cement Board Systems may be used for the walls and ceilings around indoor swimming pools. Consideration shall be given for adequate ventilation and corrosion protection of metal hangers and framing members.
- 6 Steam Rooms and Saunas**—For steam rooms and saunas where temperatures exceed 120° F for extended periods, use dry-set or latex-portland cement mortar; do not use organic adhesive.
- 7 Additional Information**—For complete specifications and more information on United States Gypsum Company products and systems, see the following technical folders:

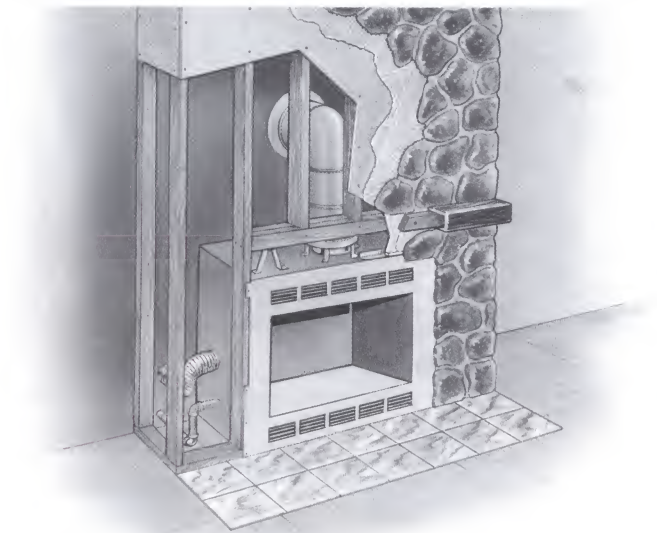
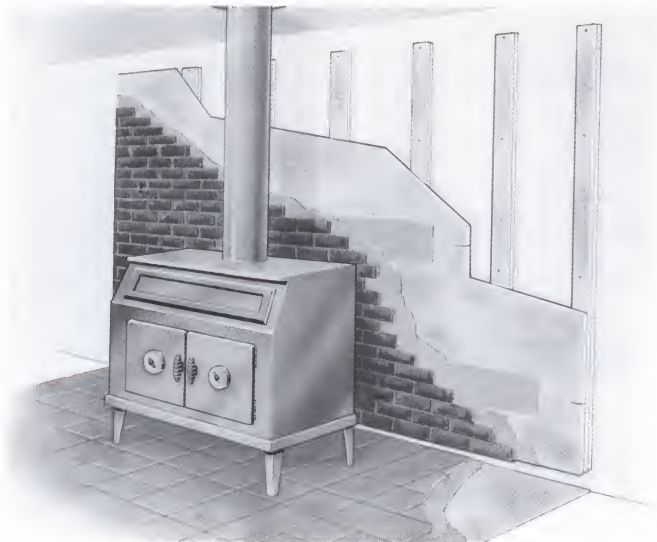
SA-700	DUROCK Exterior Cement Board Systems
SA-920	Plaster Products, Accessories and Systems
SA-923	Drywall/Steel-Framed Systems
SA-924	Drywall/Wood-Framed Systems
SA-927	Gypsum Panels and Accessories
WB-1868	USG High Performance Floor/Ceiling Systems

For more information on DUROCK Interior Cement Board Systems and accessories, see the following technical data sheets:

A-799	Installation Guide for Steel Framing (11-87)
CB-164	Fire and Sound Test Data (12-88)
CB-198	Floor Protectors and Wall Shields (6-89)
CB-199	Ceramic Tile Ceilings (6-89)
CB-758	Installation Guide for Wood Framing (12-89)

For additional information on cement board products, contact a United States Gypsum Company sales office listed on page 8.

For more information on tile systems, special construction conditions such as expansion joints, tubs and showers, and recommended materials and methods, refer to current Tile Council of America Handbook and ANSI Specifications for Installation of Ceramic Tile Standards.



- 1 System Performance**—Systems covered herein have been tested and evaluated for use as described. For other system applications, consult with your local representative.

All details, specifications, and data contained in this literature are intended as a general guide for using DUROCK Interior Cement Board Systems. These products must not be used in a design or construction of any given structure without complete and detailed evaluation by a qualified structural engineer or architect to verify suitability of a particular product for use in the structure.

Information in this publication should be used only for DUROCK Interior Cement Board Systems, as physical properties of competitive products may vary. United States Gypsum Company assumes no liability for failure resulting from the use of alternative materials or improper application or installation of DUROCK Interior Cement Board Systems as specified herein.

United States Gypsum Company will provide building officials and design professionals upon written request with test certification for published fire, sound and structural data covering systems constructed with Company products and assembled to meet performance requirements of established test procedures specified by various agencies.

- 2 Expansion and Contraction**—Interior wall surfaces should be isolated with surface control joints (sometimes referred to by the industry as expansion joints) or other means where: (a) a wall

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company and shall be installed in accordance with their current printed directions.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 Environmental Conditions

In cold weather and during backer board and tile installation, temperatures within the building shall be maintained within the range of 45° to 100°F. Adequate ventilation shall be provided to carry off excess moisture. Wood framing shall approximate the moisture content it will reach in service by allowing the enclosed building to stand as long as possible prior to the application of the backer board. Do not install board when it is wet.

1.5 Framing

Steel or wood wall framing to receive DUROCK Board shall be structurally sound, free from bow, and in general compliance with local building code requirements. Damaged and excessively bowed studs shall be replaced before installation of DUROCK Board. Framing shall be designed (based on stud properties alone) not to exceed L/360 deflection. Steel framing must be 20-ga. or heavier with a corrosion-resistant metal coating equivalent to G60 hot-dipped galvanized.

1.6 Installation Practices

DUROCK Board should be cut to size with a carbide tipped knife and a straight edge. A power saw should be used only if it is equipped with a dust collection device and NIOSH-approved dust mask is worn.

Part 2: Products

2.1 Materials

A Cement Board

- DUROCK Interior Cement Board, 1/2" or 5/8" thickness, 32", 36" or 48" width x lengths of 3' to 8'.
- DUROCK Underlayment, 3/8" thickness, 48" width x 4' length.
- DUROCK RB, 1/2" thickness, 32" width x 8' length.
- DUROCK Exterior Cement Board, 1/2" thickness, 48" width x 8' length.

B Joint Reinforcement—DUROCK Interior Tape.

C Fasteners

- DUROCK Steel Screws, 1 1/4" and 1 3/8" for 14 to 20-ga. steel framing; DUROCK Wood Screws, 1 1/4", 1 3/8" and 2 1/4" for wood framing.
- Nails, (1 1/2" hot-dipped galvanized roofing nails).
- Staples, (1/4" x 3/8" galvanized staples for DUROCK Underlayment).

D Subfloor—(3/8") (3/4") plywood, 4' x 8' sheets, exterior grade or better, exterior glue conforming with PS-1-66, T&G or back block long edges.

E Adhesives/Mortars

- Products compatible with high pH-based DUROCK Cement Board:
- Meeting ASTM C557-73: Multi-Purpose Adhesive (for subfloor to framing attachment).
- Meeting ANSI A136.1 Type I: DUROCK Ceramic Tile Adhesive.
- Meeting ANSI A118.4: DUROCK Latex Fortified Mortar.
- Meeting ANSI A118.1: Thin-Set Mortar (can be mixed with Acrylic Latex Additive).

F Grout

- Products compatible with high pH-based DUROCK Cement Board:
- Meeting ANSI A118.6: DUROCK Latex Fortified Grout;

Commercial Dri-Set Grout mixed with Acrylic Latex Grout Additive.

G Tile—Tile shall meet ANSI A137.1.

Part 3: Execution

3.1 Floors

A Subfloor—Apply 3/8" bead of multi-purpose adhesive to center of top flange of joists. Place 3/8" min. exterior grade plywood sheets with long dimension across or parallel to wood or steel joists spaced max. 16" o.c. Fasten plywood to steel joists with 1 1/8" pilot point Type S-12 screws spaced 16" o.c. Fasten plywood to wood joists with adhesive and suitable nails or screws spaced max. 12" o.c.

B Panel Application—Laminate 3/8" DUROCK Underlayment to subfloor using ceramic tile adhesive, latex fortified mortar or thin-set mortar mixed with acrylic latex additive applied to subfloor with 1/4" square-notched trowel for thin set, 3/32" V-notched trowel for adhesive. Place underlayment with joints staggered from subfloor joints. Fit ends and edges closely but not forced together. Fasten to subfloor with 1 1/4" DUROCK Wood Screws or 1 1/2" galvanized roofing nails spaced 8" o.c. in both directions with perimeter fasteners at least 3/8" and less than 1/2" from ends and edges; or with 1/4"x 3/8" galvanized staples spaced 4" o.c. in both directions.

1/2" and 3/8" DUROCK Cement Board—Same procedure as DUROCK Underlayment except fastening with staples is not permitted.

3.2 Walls

A Framing—Space wood and steel framing a maximum of 16" o.c. (24" o.c. for UL Design U459). The studs of freestanding furred walls must be secured to exterior wall with wall furring brackets or laterally braced with horizontal studs or runners spaced 4' o.c. max.

B Panel Application—After tub, shower pan or receptor is installed, place temporary 1/4" spacer strips around lip of fixture. Pre-cut board to required sizes and make necessary cut-outs. Fit ends and edges closely but not forced together. Install board abutting top of spacer strip. Stagger end joints in successive courses. Fasten boards to wood studs spaced max. 16" o.c. and bottom plates with 1 1/4" DUROCK Wood Screws or 1 1/2" galvanized roofing nails spaced 8" o.c. Fasten boards to steel studs spaced max. 16" o.c. and bottom runners with 1 1/4" DUROCK Steel Screws spaced 8" o.c. with perimeter fasteners at least 3/8" and less than 1/2" from ends and edges. In double-layer walls where backer boards are installed over base-layer gypsum boards, apply a water barrier (not a vapor retarder) over gypsum boards.

3.3 Counter Tops

A Base—Install min. 1/2" exterior grade plywood base across wood cabinet supports spaced max. 16" o.c. Position ends and edges over supports.

B Panel Application—Laminate 3/8" DUROCK Underlayment to plywood using ceramic tile adhesive, latex fortified mortar or thin-set mortar mixed with acrylic latex additive applied to plywood with 1/4" square-notched trowel for thin set, 3/32" V-notched trowel for adhesive. Fasten to plywood with 1 1/4" DUROCK Wood Screws or 1 1/2" galvanized roofing nails spaced 8" o.c. in both directions and around edges; or with 1/4"x 3/8" galvanized staples spaced 4" o.c. in both directions and around edges.

1/2" and 3/8" DUROCK Cement Board—Same procedure as DUROCK Underlayment except fastening with staples is not permitted.

3.4 Ceilings

- A Framing**—Ceiling joists, furring channels or strips must be spaced max. 16" o.c. Framing must be capable of supporting the total ceiling system dead load, including insulation, ceramic tile, bonding materials and cement board, with deflection not exceeding L/360 of the span. When steel framing is used, min. 20-ga. is required.
- B Panel Application**—Apply ½" DUROCK Cement Board to framing with long dimension across framing. Center end or edge joints on framing and stagger joints in adjacent rows. Fit ends and edges closely, but not forced together. Fasten boards to steel framing with 1¼" DUROCK Steel Screws spaced 6" o.c. and to wood framing with 1½" DUROCK Wood Screws spaced 6" o.c. with perimeter fasteners at least ¾" and less than ¾" from ends and edges. If necessary, provide additional blocking to permit proper attachment. Edges or ends parallel to framing shall be continuously supported.

3.5 Wall Shield

- A Furring**—Cut ½" DUROCK Interior Cement Board to panel and furring strip sizes with a scoring tool. Attach a double layer of furring strips to wall framing with 2¼" DUROCK Wood Screws or 2¼" galvanized roofing nails with ¾" minimum framing penetration.
- B Panel Application**—Attach ½" DUROCK Cement Board wall shield through furring to wall framing with 2¼" galvanized roofing nails with ¾" minimum framing penetration. Prefill joints with latex-fortified portland cement mortar and then immediately embed tape and level the joints. As an alternate, apply DUROCK Tape over the joints and then apply latex-fortified portland cement mortar, forcing it through the tape to completely fill and level joints. This may require several passes. Optional: Finish with thin brick or ceramic quarry tile set in a bed of latex-fortified mortar. Grout tiles.

3.6 Floor Protector

- A Panel Application**—Apply ⅛" to ¼" thick latex-fortified portland cement to solid surface—never on top of carpeting or padding. Attach ½" DUROCK Cement Board with 1¼" DUROCK Wood Screws or 1½" galvanized roofing nails at 8" o.c. both directions and with ¾" minimum flooring penetration.
- B Hearth Extension**—To substitute DUROCK Panels in hearth extension designs, use the guidelines specified by local building code, fireplace manufacturer, and the following formula:

$$\frac{k\text{-value DUROCK}}{k\text{-value specified}} \times \frac{\text{Hearth extension thickness (specified)}}{\text{Thickness of DUROCK panels (not less than hearth extension thickness specified)}} = \text{Thickness of DUROCK panels (not less than hearth extension thickness specified)}$$

Example: If the fireplace manufacturer or code requires one layer of ¾" millboard with a k-value of .84, use the formula as follows to determine the required layers of DUROCK panels:

$$\frac{1.92}{.84} \times .75" = 1.71" \text{ of DUROCK or four layers}$$

Installation of panels for hearth extension is same as 3.6.A.

- C Joint Treatment and Finish**—(see section 3.5B).

3.7 Joint Treatment Application For Tiled Areas

Prefill all DUROCK Panels joints, and joints where DUROCK Panels abut other panels or surfaces such as gypsum board, with tile-setting mortar or adhesive and then immediately embed tape and level the joints. As an alternate, apply DUROCK Interior Tape over the joints and then apply tile-setting mortar or adhesive, forcing it through the tape to completely fill and level the joints. This may require several passes to accomplish.

3.8 Tile Installation

Install tile and grout in accordance with ANSI A108.4 for Type I organic adhesive or ANSI A108.5 for dry-set or latex portland cement mortar and ANSI A108.10 for grouts. Before tile application begins, the moisture content of the DUROCK Cement Board should be allowed to adjust as closely as possible to the level it will reach in service. Avoid extreme changes in environmental conditions during the curing of the tile-setting material. Provide adequate ventilation to carry off excess moisture.

3.9 Joint Treatment Application for Untiled Areas

For small areas where the DUROCK Board will not be tiled, such as a board extending beyond the tiled area and abutting another surface, treat joints as follows. Seal tile backer board with thinned ceramic tile adhesive. (Mix four parts adhesive with one part water.) Embed SHEETROCK Joint Tape over joints and treat fasteners with SHEETROCK Setting-Type Joint Compound (DURABOND 45 or 90) applied in conventional manner. Flat trowel SHEETROCK Setting-Type Joint Compound over board to cover fasteners and fill voids to a smooth surface. Finish joints with at least two coats SHEETROCK Ready-Mixed Joint Compound. Do not apply ready-mixed joint compound over unsealed board.

Sales Offices: **Arizona:** Phoenix, (602) 866-0795 • **California:** Fremont, (415) 792-4400, Glendale, (818) 956-1882 • **Florida:** Jacksonville, (904) 764-3293, Miami, (305) 557-4501 • **Georgia:** Atlanta, (404) 393-0770 • **Hawaii:** Honolulu, (808) 538-7712 • **Illinois:** Chicago, (312) 606-5845 • **Indiana:** Indianapolis, (317) 848-1513 • **Louisiana:** New Orleans, (504) 241-2020 • **Maryland:** Baltimore, (301) 355-2200 • **Massachusetts:** Charlestown, (617) 241-8530 • **Michigan:** Southfield, (313) 569-1900 • **Minnesota:** Bloomington, (612) 854-4233 • **Missouri:** St. Louis, (314) 349-0980 • **New York:** Albany, (518) 458-7437, Oakfield, (716) 948-5287, Stony Point, (914) 786-2820 • **North Carolina:** Charlotte, (704) 552-7402 • **Ohio:** Chesterland, (216) 729-1956 • **Oregon:** Beaverton, (503) 626-8864 • **Pennsylvania:** Pittsburgh, (412) 341-2434 • **Tennessee:** Nashville, (615) 361-8419 • **Texas:** Dallas, (214) 490-0771, Houston, (713) 666-0751 • **Utah:** Salt Lake City, (801) 266-4975 • **Virginia:** Richmond, (804) 285-7528 • **International Division:** Chicago, (312) 606-5840.

Technical Services: Atlanta, GA (404) 393-0770 • Tarrytown, NY (914) 332-8000 • Chicago, IL (312) 606-5788 • Glendale, CA (818) 956-1882.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, DUROCK, THERMAFIBER, DURABOND, SHEETROCK, FIRECODE.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Patents: DUROCK Cement Board is covered by the following patents: No. 4,916,004; 4,450,022; 4,488,909; 4,504,335.

United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
1-800-347-1345

A Subsidiary of USG Corporation

SA-932/1-92 Printed in U.S.A.

Texture and Finish Products

Texture Finishes to Enhance Wall and Ceiling Esthetics

Benefits

Versatile Textures and Patterns

Wide variety of possible texture patterns to provide distinctive interior styling. Virtually any esthetic effect can be achieved.

Economical

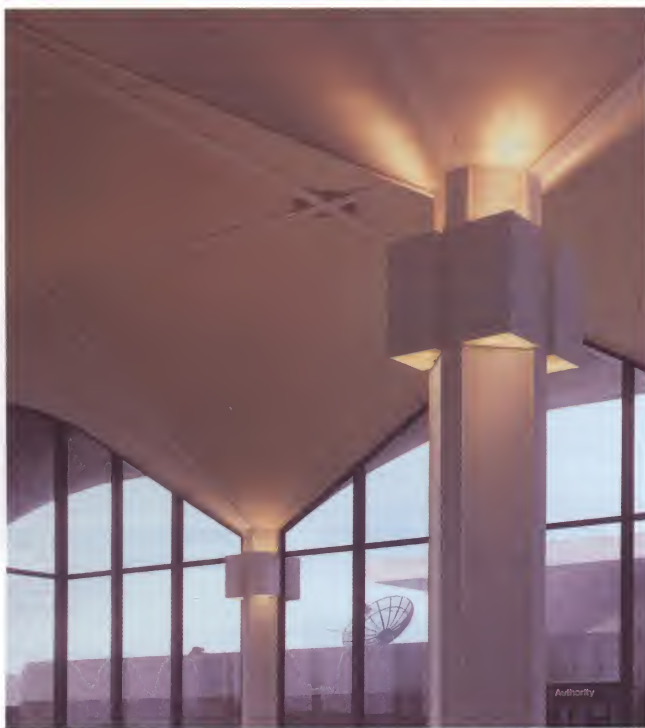
Fast, easy application; quick drying. Also hides minor surface blemishes to reduce surface preparation needed. Saves labor time to preserve job profits.

High Quality and Consistent Performance

Special formulations provide durable, uniform finishes; predictable results. Full range of texture finishes reflects decades of research and testing, both in the laboratory and the marketplace.

Unit Responsibility

Use of texture finish products from U.S. Gypsum Company brings the important advantage of dealing with a single manufacturer for the components of the finished wall or ceiling.



USG Acoustical Finish provides a beautiful, monolithic, sound-absorbing ceiling.



SHEETROCK First Coat provides uniform look to paint finish even in direct, natural lighting.

A Superior Finish Depends on Good Surface Preparation

SHEETROCK First Coat—a flat latex basecoat paint formulated to provide a superior first (prime) coat over interior gypsum board and concrete surfaces. Equalizes differences between the porosity and texture variations of gypsum board face paper and finished joint compound to minimize decorating problems such as "joint banding." Approved for use as an additive to USG texture products. Applies with brush, roller or spray equipment. Dries to a white finish in less than 30 minutes; topcoat within an hour. Not intended as a final coating—should be overpainted when dry. Available ready-mixed or in powder form—mixed with water at jobsite. Covers approximately 300 to 500 sq. ft. per gallon.

Interior Texture Finishes

USG Acoustical Finish—an exclusive spray finish for interior gypsum panel, concrete and basecoat plaster ceilings. Asbestos-free, for use in new construction and renovation. Provides a natural-white, evenly-textured, sound-rated finish. For use on non-contact surfaces only. Surface burning characteristics: flame spread 10, smoke developed 25. Sound rated: NRC .50 for gypsum panels, .55 for concrete, .55 for conventional plaster at 1/2" finish thickness.

IMPERIAL QT Spray Texture Finish—aggregated non-asbestos powder, produces acoustical finish appearance on ceilings; provides no acoustical correction. Excellent bonding qualities; helps conceal minor surface defects. Formulated with polystyrene aggregate for spray application in super-coarse, coarse, medium or fine textures. White only. Surface burning characteristics: flame spread 5, smoke developed 0 for polystyrene-aggregated formulation applied over SHEETROCK brand Gypsum Panels. Limitation: not recommended for use where constant humid conditions exist.

USG Latex Additive—latex emulsion for use with IMPERIAL QT Spray Texture Finish. Provides increased bond and surface hardness when added to wet-mix at a rate of 1 to 2 pints per bag of Finish.

USG Spray Texture Finish—a top performance, non-asbestos powder product, available aggregated or unaggregated. Fast drying; offers good concealment and superior coverage. Produces light spatter, fog-and-spatter and orange peel finishes with machine spray. Highly effective on sidewalls and ceilings. Tinting not recommended; readily overcoated with most wall paints. Not washable unpainted.

SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)—unaggregated texture coating designed for application over properly prepared interior surfaces. Produces a variety of texture patterns from bold spatter/knockdown to light orange peel. Dries to a hard, white finish. Helps conceal minor substrate defects. Apply with brush, roller or spray equipment. Not intended as a final coating—should be overpainted when dry. Not washable unpainted.

USG Multi-Purpose Texture Finish—an economical, unaggregated, non-asbestos powder product for producing light to medium-light textures on drywall or other interior surfaces. Textured effect obtained by brush, roller or spray application. Helps conceal minor surface defects. Dries to a soft-tone white finish. Should be overpainted on walls, may be left unpainted on ceilings when an adequate amount of material is applied to provide sufficient hiding properties. Not washable unpainted.

USG Texture XII Drywall Surfacers—a non-asbestos powder product, mixed with water, for fast, low-cost spray application to

interior gypsum drywall surfaces. Aggregated for sand finish.

Combines easy mixing, fast drying, excellent coverage and good concealment. An ideal base for wall paints; may be left unpainted on ceilings when an adequate amount of material is applied to provide sufficient hiding properties. Not washable unpainted.

USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture—white, non-asbestos, latex-type material for interior surfaces, offers extra thickness with the speed of a ready-mixed formulation and a one-coat application. Develops a durable surface with minimal to no fissuring. Excellent hiding over gypsum panels, concrete, primed plaster, masonry and non-staining wood surfaces. Can be job-mixed with a variety of aggregates for greater coverage and applied with brush, roller, spray or trowel for a range of texture effects. Should be overpainted on walls. Not washable unpainted.

SHEETROCK All Purpose Joint Compound (Powder)—easy-mixing, smooth-working product that can be used to produce attractive light to medium-light textures. Non-asbestos powder mixed with water. Color is white but may vary in degree of whiteness. Surfaces should be painted. Not washable unpainted. Hand-applied with brush, roller or trowel.

SHEETROCK Topping or All Purpose Joint Compound Ready-Mixed—virtually ready to use, these products will produce textures ranging from light to medium depending upon method of application. Color is white but may vary. Surfaces should be painted. Not washable unpainted. Hand-applied with brush, roller or trowel.

COVER COAT Compound—a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise); on ceiling areas below grade; on surfaces that project outside the building, or on other areas that might be subject to moisture, freezing, efflorescence, pitting or popping. Not washable unpainted.



IMPERIAL QT Spray Texture: Coarse finish



USG Multi-Purpose Texture Finish: Light stipple finish



USG QUIK & EASY Wall and Ceiling Texture: Extra thick finish



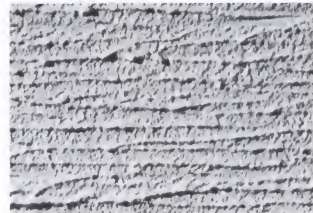
USG Spray Texture Finish: Spatter-knockdown finish



SHEETROCK Wall and Ceiling Spray Texture (TUF TEX): Spatter finish



Typical sand-effect finish obtained with aggregated Texture XII Drywall Surfacers. In application, fan technique is used on walls, cross-spray on ceilings.



Simple roller-applied texture is obtained with SHEETROCK Topping or All Purpose Joint Compound Ready-Mixed. Same products thus can be used for both joint finishing and texturing on job.

The most common causes of finish failures on interior surfaces are: (a) Base surface not dry; (b) Surface improperly cleaned and patched; (c) Variable suction in the base; (d) Failure to use proper treatment for different surfaces, conditions, and finishes. It is estimated that 75% of interior finish failures are due to neglected or improper preparation before the finish container was opened.

Satisfactory results with these finish products, as with all finishes, depend upon good job practices:

- 1 Surfaces to be finished must be clean, dry, sound; free of grease, oil, wax, dust or other foreign matter; free of flaking, crumbling or chalking conditions; must be properly prepared.
- 2 Before texturing, apply a prime coat of SHEETROCK First Coat or a good quality, white interior latex flat wall paint with high solids content.
- 3 Atmospheric and structural temperatures must be 55°F minimum during and after application (until building is occupied). Unvented gas or oil heaters should not be used. Provide adequate ventilation at all times for proper drying.
- 4 Finishes of the water-thinned type should not be used over wallpaper having water-soluble colors. Must be protected from freezing.

- 5 New unpainted plaster (except veneer plaster), stucco, poured concrete, patches in masonry surfaces must age 60 days minimum prior to paint application.

Any other limitations are stated in the label directions for the paint product used.

- 6 Heavy water-based textures may result in sagging of gypsum board ceilings under these conditions: high heat and humidity, improper ventilation and/or board application to framing and insufficient board thickness for span between supports. Application of a primer equalizes surface porosity and provides a uniform color. Primers are not intended to reduce sag potential. When using water-based textures, refer to the following table:

Board thickness (in.)	Ceiling application method (long edge relative to frame)	Maximum frame spacing o.c. (in.)
3/4"	Not Recommended	—
1"	Perpendicular Only	16
1 1/2"	Perpendicular Only	24

Note: Double layer laminated, 3/4" or greater total thickness—24" o.c.

Selector Guide

Type of finish	Surface priming preparation	Finish product	Thinners	Method application	Drying time (hours)		Coverage (sq. ft.)
					Touch	Recoat	
INTERIOR WALLS							
Light to medium-light textures	SHEETROCK First Coat or flat, latex paint	USG Multi-Purpose Texture Finish	W	B,R,S	2	24	10-20/lb.
Spatter, spatter/knockdown, light orange-peel	SHEETROCK First Coat or flat, latex paint	USG SprayTexture Finish (aggregated or unaggregated)	W	S	2	24	10-25/lb
Medium stipple, orange peel, spatter, spatter/knockdown	SHEETROCK First Coat or flat, latex paint	SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)	W	S1, R2, B2	2	24	20-40/lb
Sand-finish effect	SHEETROCK First Coat or flat, latex paint	USG Texture XII Drywall Surfacers—(aggregated)	W	S	1	24	20-35/lb
Light to medium textures	SHEETROCK First Coat or flat, latex paint	SHEETROCK All Purpose Joint Compound (Powder)	W	R,B,T	2	24	varies
Light to medium textures	SHEETROCK First Coat or flat, latex paint	SHEETROCK Topping or All Purpose Joint Compound Ready-Mixed	W	R,B,T	2	24	varies
Stipple, knockdown, light to heavy textures	SHEETROCK First Coat or flat, latex paint	USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture	W	B,R,S,T	2	24	26-70/gal.
Stipple flat finish, fog spray, spatter spray, orange-peel	SHEETROCK First Coat or flat, latex paint	COVER COAT Compound	W	B,R,S	2	24	1.5-2/lb
INTERIOR CEILINGS							
Acoustical texture	SHEETROCK First Coat	USG Acoustical Finish	W	S	24-28	3-4 days	1.5-3.0/lb
Super texture	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray super coarse)	W	S	1	24	up to 8/lb
Coarse texture	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray coarse) (polystyrene/coarse)	W	S	1	24	up to 8/lb
Medium texture	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray medium) (polystyrene/medium)	W	S	1	24	up to 8/lb
Fine texture	SHEETROCK First Coat or flat, latex paint	IMPERIAL QT Spray Texture Finish (polystyrene/E-Z spray fine)	W	S	1	24	up to 8/lb
Light to medium-light textures	SHEETROCK First Coat or flat, latex paint	USG Multi-Purpose Texture Finish	W	B,R,S	2	24	10-20/lb
Spatter, spatter/knockdown light orange-peel	SHEETROCK First Coat or flat, latex paint	USG Spray Texture Finish (aggregated or unaggregated)	W	S	2	24	10-25/lb
Medium stipple, orange peel, spatter, spatter/knockdown	SHEETROCK First Coat or flat, latex paint	SHEETROCK Wall and Ceiling Spray Texture (TUF TEX)	W	S1, R2, B2	2	24	20-40/lb
Sand-finish effect	SHEETROCK First Coat or flat, latex paint	USG Texture XII Drywall Surfacers—(aggregated)	W	S	1	24	20-35/lb
Stipple, swirl, light to heavy textures	SHEETROCK First Coat or flat, latex paint	USG QUIK & EASY Ready-to-Use Wall and Ceiling Texture	W	B,R,S,T	2	24	26-70/gal.
Stipple flat finish, fog spray, spatter spray, orange-peel	SHEETROCK First Coat or flat, latex paint	COVER COAT Compound	W	B,R,S	2	24	1.5-2/lb

NOTES: "Drying Time" estimates are based on average conditions. Touch = furniture can be returned to living areas. Abbreviations, Methods of Application: B = brush, R = roller, S = spray, T = trowel, O = other; 1, 2, 3 = order of preference. Abbreviations: W = water per directions; "Coverage" provides a relative comparison between products applied according to directions; not recommended for job estimating. Coverage can vary widely depending on substrate conditions, mixing proportions, application procedures and texture appearance desired. Primers are not intended to reduce sag potential or to prevent stains or contaminants from migrating to the finished surface.

Part 1: General

1.1 Scope—Specify to meet project requirements.

1.2 Qualifications

All materials, unless otherwise indicated, shall be applied in accordance with its current printed directions.

1.3 Submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials which, when approved, shall be the standards of finish to be provided on this project.

1.4 Delivery and Storage of Materials

- A** All materials shall be delivered in their original unopened containers bearing the manufacturer's name, brand name and directions for use.
- B** All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 Environmental Conditions

During cold weather, thermostatically controlled heat shall be provided to maintain 55°F minimum temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used to provide heat. Adequate ventilation shall be provided at all times for proper drying.

Part 2: Products

2.1 Materials

(Specify surface treatment and finish materials from product descriptions and Selector Guide in this catalog.)

2.2 Mixing and Equipment

Mix texture finish products with water only as directed by manufacturer. Do not overdilute. Use spray equipment of a size and type to assure acceptable results.

Part 3: Execution

Note to architect: Where more detailed specification is desired, select from applicable product data sheet.

3.1 Surface Preparation

All surfaces, including joint compound applications, filling or patching treatments, shall be dry, clean and sound. Remove any water-soluble materials from surface. Dull or roughen any glossy surfaces. Prime metal surfaces with a rust-inhibitive primer. Fill and seal any exposed wood surfaces.

Allow new concrete ceilings and any new concrete patches or repairs to age at least 60 days before applying texture finishes. Remove form oils or parting materials, efflorescence, grease and other deposits from concrete surfaces. Finish patched or repaired areas to provide a uniform texture and surface.

Grind down any ridges or other protrusions resulting from forms or other causes to the same level as adjacent surfaces; remove all grinding sludge or dust. If filling is required, apply a SHEETROCK Setting-Type (DURABOND) or Lightweight Setting-Type (EASY SAND) Joint Compound, or COVER COAT Compound. Apply in as many coats as are needed to provide a level, crack-free fill without edge joinings that show through decoration.

Exercise special care to provide a smooth, level surface, free of irregularities, in areas that will be exposed to sharply angled lighting.

In drywall construction, treat joints and fastener heads with a joint system manufactured by United States Gypsum Company, following manufacturer's instructions. Smooth and fill any scratches or scuffs in gypsum drywall surfaces.

When all surfaces are prepared and dry, apply a full coat of SHEETROCK First Coat or a good-quality, undiluted white interior latex flat wall paint with high solids content over entire surface. Allow to dry.

3.2 Application

Apply at a coverage rate not to exceed directions printed on container. Apply material to blend uniformly and cover fully without starved spots or other evidence of thin application. Provide uniform texture without application patterns. Remove any texture droppings or overspray from walls, windows and floor, leaving room clean for following trades.

Sales Offices

Arizona:	Phoenix, (602) 866-0795
California:	Fremont, (415) 792-4400 Glendale, (818) 956-1882
Florida:	Jacksonville, (904) 764-3293 Miami, (305) 557-4501
Georgia:	Atlanta, (404) 393-0770
Hawaii:	Honolulu, (808) 538-7712
Illinois:	Chicago, (312) 606-5845
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Louisiana:	New Orleans, (504) 241-2020
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Michigan:	Southfield, (313) 569-1900
Minnesota:	Bloomington, (612) 854-4233
Missouri:	St. Louis, (314) 349-0980
New York:	Albany, (518) 458-7437 Oakfield, (716) 948-5287 Stony Point, (914) 786-2820
North Carolina:	Charlotte, (704) 552-7402
Ohio:	Chesterland, (216) 729-1956
Oregon:	Beaverton, (503) 626-8864
Pennsylvania:	Pittsburgh, (412) 341-2434
Tennessee:	Nashville, (615) 361-8419
Texas:	Dallas, (214) 490-0771 Houston, (713) 666-0751
Utah:	Salt Lake City, (801) 266-4975
Virginia:	Richmond, (804) 285-7528
International Division:	Chicago, (312) 606-5840

Cautions:

Refer to product packaging or product data sheet for a list of product ingredients. Inhalation of dust may cause irritation of the upper respiratory system. Long term overexposure to mica or talc may cause lung damage. When handling this product avoid creating dust. If dust is created use dust collector or wear a respirator approved by NIOSH. Use of safety glasses is recommended. Do not take internally. KEEP OUT OF REACH OF CHILDREN.

Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company or a related company: USG, IMPERIAL, SHEETROCK, QUIK & EASY, COVER COAT, TUF-TEX, DURABOND, EASY SAND.

Notice: We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

United States Gypsum Company

101 South Wacker Drive
Chicago, Illinois 60606-4385
A Subsidiary of USG Corporation

SA-933/rev. 1-92 Printed in U.S.A.

USG Interiors, Inc.

SA-1020

Wall Systems



USG



USG Interiors: Working Beautifully At USG Interiors, we strive to combine aesthetics and performance with exceptional value in defining interior space.

That takes an eye for color, a sense of proportion, plus technical knowledge and an adherence to standards. But it also takes the ability to maintain quality with a respect for budget.

The end result: wall, ceiling and access floor systems that work beautifully to create unique, contemporary environments.

Walls for Every Workplace The following pages describe wall systems that accommodate commercial and institutional applications. Walls that meet your requirements for ease of relocation, on-time delivery, sound control and cost control. Walls with excellent durability and performance characteristics. Beautiful walls that provide options in finishes, accessibility and fire ratings.

Walls that work beautifully from USG Interiors—your complete source for wall, ceiling and access floor systems.

Table of Contents

ULTRAWALL® Partition System	4
DONN® High Performance Wall	6
Technical Data	
Architectural Specifications	10



Performance and Economy with Exceptional Fire and Sound Ratings For economical sound attenuation and fire rating in the office environment, specify the ULTRAWALL system. This flexible system is based on sturdy 3/4", pre-kerfed and prefinished gypsum panels and heavy-duty steel framing that give the system a one-hour fire rating and sound control transmission coefficient of 42⁽¹⁾. The ULTRAWALL partitions are easy to install and relocate for long-term cost savings.

Fast Assembly Once ceiling track and floor runner are in place, studs key into the kerfed edges of gypsum panels to lock panels securely. To meet changing space requirements, an entire wall or just a portion of it can be dismantled and moved.

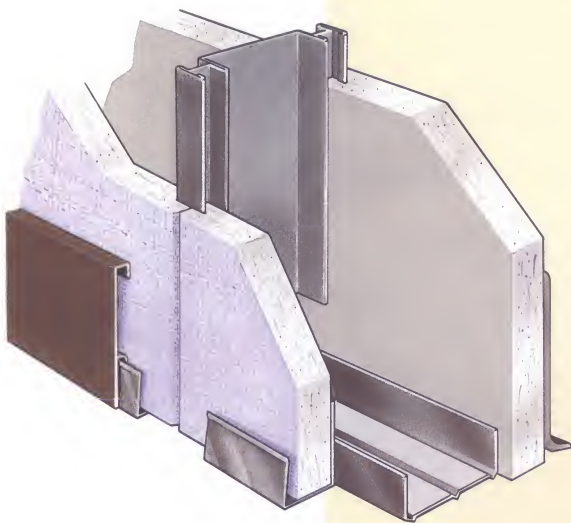
Accepts Hanging Furniture ULTRAWALL partitions can be erected as a system to accept most major brands of hang-on wall furniture, or an existing

ULTRAWALL system can be changed to a hang-on system by replacing steel studs with aluminum studs. These universal aluminum studs accept various standards for hang-on furniture in nominal 24", 30", 48", 54" and 60" widths. So all the flexibility, efficiency and economy of hang-on furniture are yours with the privacy of full-height partitions.

Doors, Glazing and

Accessories A complete line of accessories includes steel or aluminum door frames, aluminum or steel trims, vinyl floor base molding, aluminum or steel glazing components and interface standards for wall mounting furniture.

Wire Management A 1 1/2" wide chase space lets you run utilities and communications cable either vertically or horizontally in the wall.



(1) ULTRAWALL partitions can be modified to meet more stringent fire and sound requirements. Standard one-hour fire rating does not apply to aluminum studs. See ULTRAWALL Partition System Technical Information Guide, MP-517, for complete test data.



Flexibility Locate (and relocate) door openings, sidelites and glass walls wherever you want them. T- or H-studs accommodate different panel configurations on opposite sides of the wall or the same side if desired.

Wide Finish Selection Flush-mounted panels come prefinished in 36 vinyl and 22 fabric finishes (contact your sales representative for material samples.) Optional flush outside corners and trimless inside corners enhance the monolithic look. Matching exposed trim in painted or anodized aluminum, and vinyl

or painted steel finish, is available for door and window frames and ceiling tracks.

Affordability: Immediate and Long-Term ULTRAWALL partitions are comparable in installed cost to drywall with field-applied vinyl.

Principal Components

- Prefinished, pre-kerfed gypsum panels
- Ceiling track
- Floor runner
- Studs (interchangeable)
- Glazing components
- Door frames
- Trim for ceiling, base, corners and terminations

ULTRAWALL Partition System Component Information

Panels	
<i>Gypsum Panels</i>	¾" x 24", 30". Bevel edge, factory kerfed.
<i>Finish</i>	Vinyl. Fabric.
<i>Attachment Studs</i>	Factory kerfed edge to fit stud.
<i>Steel</i>	Roll-formed galvanized steel "H" or "T" configuration. 3¾" wall thickness.
<i>Aluminum</i>	Extruded aluminum "H" or "T" configuration. 3¾" wall thickness.
Floor Runner	
<i>Steel</i>	Galvanized steel. 1¼" width, 1¼" return.
Ceiling Track	
<i>Steel</i>	3¾" width, 1¼" return. Painted.
<i>Aluminum</i>	Flanged rail (ARL-300) or plain rail (ARL-301). 3¾" width, 1¼" return. Satin anodized, ULTRABRONZE or painted.
Door Frames	
<i>Aluminum</i>	SMR-Delta. Self mortising, reversible. Satin anodized, ULTRABRONZE or painted.
<i>Steel</i>	Throated for installation without regard to module. 6'8", 7'0" mortised for 1½ pair of 4½" x 4½" butt hinges and standard A-115.1 strike, or full height mortised for 2 pair hinges. Non-handed, reversible (6'8" and 7'0" only). 1½ hr. Class B fire rating for 4'0" x 7'6" max. opening with metal-faced or gypsum panels. Withstands 1-million slam test. Painted.
Glazing	
<i>Aluminum</i>	Nonmodular components (no glass). Satin anodized, ULTRABRONZE or painted. Glazing covers to fit door jamb or rail. Snap-on glazing stops to fit H-rail.
<i>Steel</i>	Throated for installation without regard to module. Painted.
Floor Base	
	Vinyl snap-on base.
Trims	
<i>Aluminum</i>	Satin anodized, ULTRABRONZE or painted.
<i>Steel</i>	Painted.
Furniture Mounting	
<i>Hardware</i>	Interface standards mount directly to aluminum studs. Paint with touch-up paint supplied by furniture manufacturer.
Sound Insulation	
	THERMAFIBER sound attenuation fire blankets, paperless, semi-rigid, mineral fiber mat 24"x48" in 1" or 1½" thickness.

Note: For detailed technical drawings, component data and assembly information, contact your representative for ULTRAWALL Partition System Technical Information Guide, MP-517 and/or ULTRAWALL Partition System Planning, Installation and Maintenance Guide, MP-501.



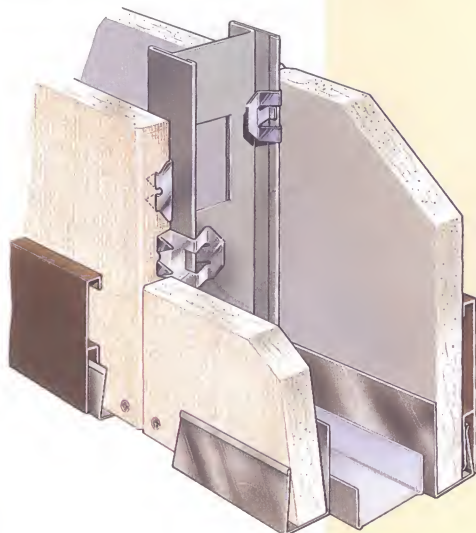
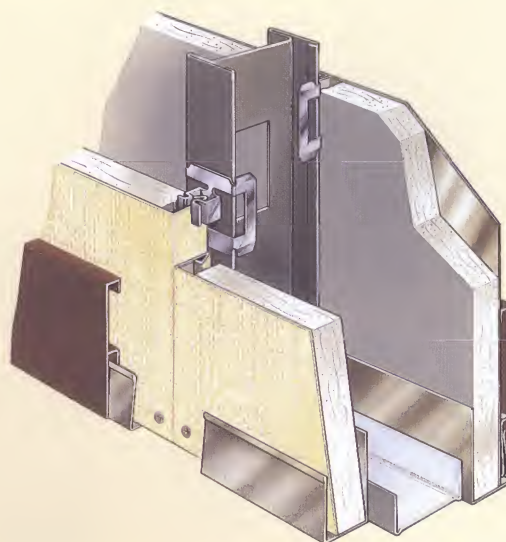
Premium Quality, Point-Accessible System That Offers Design Choice, Functional

Performance and High Rate of Relocatability This exceptionally versatile system is ideal for most commercial and institutional settings. Point-accessible framing system allows labor-efficient coordination with other trades. Framing studs lock in place, top and bottom, to build stable, sturdy walls. Gypsum panels, or metal-faced panels can be selected to meet specific needs. Because of shared framing and unified finishes, panels can be used interchangeably. The DONN High Performance Wall system provides excellent flexibility and durability to outperform all standard stud-and-runner drywall systems.

Point Accessibility Point-accessible service cavities can be used to route, modify or maintain electrical wiring and communication lines through the walls. Panels can be removed and replaced as needed. Snap-on panel design permits easy access without disturbing framework or adjacent panels.

Easy Installation Walls are erected after ceilings and flooring are in place. Adjustable, interlocking components minimize field cutting. Studs adjust to varying ceiling heights, and standard stud facings allow flexible panel placement. Spacer channels lock into place on studs, giving additional stability and eliminating the need

to measure. Panels attach directly to studs with field-applied clips. Wall system is able to compensate for building irregularities at floor and ceiling up to 1½" total variation without cutting or shimming.

Gypsum Panels**Metal-Faced Panels**

High Relocatability All panels are removable and reconfigurable. Doors and glazing options can be altered or added. Or the entire wall can be disassembled and its components used elsewhere. Snap-together assembly and durable metal construction assure reusability of components.

Gypsum Panels Best suited for the office environment, lightweight $\frac{1}{2}$ " or $\frac{5}{8}$ " gypsum panels are available in 4' widths, to minimize panel seaming. The $\frac{5}{8}$ " panels also come in convenient 24" and 30" widths, for ease of handling and transport to the job site. STC rating: 35-44.

Finish Selection for Gypsum Panels Predecorated panels in fashionable colors save labor costs. Standard finishes include 36 vinyls and 22 fabric finishes. (Contact your sales representative for material samples.)

Metal-Faced Panels These panels are recommended for high-traffic areas such as schools, health care facilities, research settings and plants. 25-gauge steel panel facings over $\frac{1}{2}$ " or $\frac{5}{8}$ " gypsum panels stand up to wear and tear. Metal panel edge gives high recoverability during relocation cycles and extends panel life.



Metal facing allows custom size panel widths to be pre-manufactured, to minimize field cutting and meet special conditions such as columns and special corners. STC rating: 40-43. One-hour fire rating available.

Specialty Finishes for Metal-Faced Panels Specialty finishes such as stainless steel, enamel paint, porcelain chalkboard, vinyl and custom laminates meet diverse functional requirements. (Contact your sales representative for material samples.)

Principal Components

- Prefinished gypsum panels
- Prefinished metal-faced gypsum panels
- Ceiling track
- Floor runner
- Studs (with telescopic extender)
- Spacer channels (interlocking)
- Panel attachment clips
- Trim for base, corners and edges
- Door frames
- Glazing, components and accessories

DONN High Performance Wall System Component Information

Gypsum Panels

Panels	1/2" x 48". 3/4" x 24", 30", or 48". Bevel edge.
Finish	Vinyl or fabric.
Attachment	Impaled edge clip.

Metal-Faced Panels

Panels	Steel, 25-gauge. 1/2" or 3/4" thick. 24" or 30" wide. Gypsum core. Square edge.
Finish	Vinyl. Fabric. Painted. Porcelain chalkboard coated. Stainless steel. Powder paint.
Attachment	Spring steel clips attached to studs grasp arrowhead edge of metal facing.

Studs

Steel	Roll-formed steel. 2" depth. Holes punched for utility passage. Locking stud extender allows for 1 1/2" variation in floor to ceiling height.
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Ceiling Track

Steel	3" or 3 1/2" width. 1 3/8" return. Painted.
--------------	---------------------------------------------------

Floor Runner

Steel	2" width. 1" return.
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Spacer Channels

	24" or 30" lengths (nominal).
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Door Frames

Aluminum	SMR-Delta. Self mortising, reversible. Satin anodized, ULTRABRONZE or painted.
Steel	Throated for installation without regard to module. 6'8", 7'0" mortised for 1 1/2 pair of 4 1/2" x 4 1/2" butt hinges and standard A-115.1 strike, or full height mortised for 2 pair hinges. Non-handed, reversible (6'8" and 7'0" only). 1 1/2 hr. Class B fire rating for 4'0"x 7'6" max. opening with metal-faced or gypsum panels. Withstands 1-million slam test. Painted.

Glazing

Steel	Throated for installation without regard to module. Painted.
--------------	-----------------------------------------------------------------

Floor Base

	Vinyl snap-on base.
--	---------------------

Trims

PVC	Vinyl.
Steel	Painted.

Sound Insulation

	THERMAFIBER sound attenuation fire blankets, paperless, semi-rigid, mineral fiber mat 24" x 48" in 1" or 1 1/2" thickness.
--	----------------------------------------------------------------------------------------------------------------------------



Note: For detailed technical drawings, component data and assembly information, contact your representative for DONN High Performance Wall System Technical Information Guide, MP-574 and/or DONN High Performance Wall System Planning, Installation and Maintenance Guide, MP-585.



Variable Module Sizes and Finishes for Infinite Design Possibilities Prefinished metal panels offer ideal choices for contemporary, functional interior walls. Finish options include fabrics, metals, vinyls and paints. Or select custom finishes for unique applications. Extended capabilities also include incremental and modular wall systems.



ULTRAWALL Partition System

Part 1—General

1.01 Related Work

- A Related work specified elsewhere:
 - 1. Conventional door and glass frames: Section_____.
 - 2. Wood doors: Section_____.
 - 3. Glazing: Section_____.
 - 4. Finish hardware: Section_____.
 - 5. Painting: Section_____.

1.02 System Description

- A Interior wall system: Partitions shall be bevel edge type, 3/8" thick. Wall centerlines are as shown on plans. System also provides door and glass frames, trims and base.

1.03 Quality Assurance

- A Wall system components shall be sourced from one manufacturer which certifies that materials meet or exceed these specifications.
- B Installing contractor: Installer shall have a history of completed jobs of similar size and scope. Contractor shall be registered and authorized by the manufacturer.
- C Sound transmission: Provide independent laboratory certification that wall system provides 42 STC (gypsum partitions tested in accordance with ASTM E90).
- D Fire protection: When required on drawings, provide independent laboratory certification that wall system has been successfully tested for 1-hour and 2-hour fire endurance and hose-stream in accordance with ASTM E119.
- E Structural: Provide transverse load rating and impact resistance tests.

1.04 Submittals

- A Samples: Submit finish and color samples.
- B Manufacturer's data called for in quality assurance section and finish performance data per Section 2.02B.
- C The partition contractor shall submit shop drawings for assemblies or conditions not fully described on working drawings.

1.05 Environmental Conditions

- A Temperature within the building shall be above a constant minimum of 65°F with relative humidity not over 70% during erection of a partition. When

required, heat shall be furnished by the general contractor. Erection of the partition systems shall not begin until building exterior provides complete protection from the outside weather. Panels shall not be stored where they are subjected to temperature, moisture or humidity extremes.

1.06 Delivery, Storage and Handling

- A Prefinished materials shall arrive at job site in their original unopened cartons or other protective packaging necessary to protect finishes. Materials should be stored in such packages until time of application. Bulk items (studs and tracks) shall arrive in banded bundles for ease of handling and distribution. Panels shall arrive and remain on adequate support to ensure flatness and prevent damage.

Part 2—Products

2.01 Manufacturer

- A ULTRAWALL partition system as manufactured by USG Interiors, Inc., Chicago, IL.

2.02 Materials

- A Framing:
 - 1. Roll-formed steel or extruded aluminum studs, as indicated on drawings, providing for attachment of gypsum panels and allowing for utility passage. Extruded aluminum studs shall be used for furniture attachment.
 - 2. Struts/runners shall be roll-formed galvanized steel to hold panels in alignment.
 - 3. Ceiling track of (steel) (aluminum) shall be designed to stabilize wall at ceiling, cover panel tops or provide for covering trim, and integrate with full-height door and glass framing.
- B Panels:
 - 1. ULTRAWALL panels shall be composed of factory kerfed gypsum board measuring 3/8" thick by (24") (30") wide by (9') (10') long.
 - 2. ULTRAWALL panels shall be predecorated in manufacturer's standard vinyl or fabric. Panels shall be factory kerfed and bevel-edged for uniform joint appearance.
 - 3. Finish performance data per the following schedule

shall be made available prior to bid:

- a Impact resistance (ASTM D2794).
- b Flame spread (ASTM E84).

C Glazing components:

Glazing shall be (aluminum) (steel) to integrate with runner, glazing and trim components. Glass furnished by others.

D Door frames:

Door frames shall be (aluminum) (steel) to integrate with runner, glazing and trim components. Frames shall measure (6'8") (7'0") (ceiling height) and () wide unless otherwise noted on drawings. Frames shall be (nonhanded reversible) (left and right handed) and mortised for (1½) (2) pair of 4½" x 4½" butt hinges and standard A-115.1 strike unless otherwise noted.

E Aluminum ceiling track, glazing and door frames shall be (satin anodized) (ULTRABRONZE anodized) (painted in manufacturer's standard colors). Steel ceiling track, glazing and door frames shall be painted in manufacturer's standard colors.

F Snap-on vinyl base. Color of base shall be from manufacturer's standard colors.

G Trims:

Trims shall be ([satin] [ULTRABRONZE] anodized) (painted) aluminum or painted steel to match other system components and made with (square-edge) (radius) outside corners.

H Furniture mounting hardware: Provide one interface standard assembly each side of wall mounted furniture. Interface standards to be painted to match furniture with touch up paint from furniture manufacturer.

I Sound insulation shall be THERMAFIBER Sound Attenuation Fire Blankets, paperless, semi-rigid, spun mineral fiber mat (1") (1½") 24" x 48".

Part 3—Execution

3.01 Inspection

- A Before stocking or installing materials, the contractor should inspect the building site to verify that floors and ceilings contain no defects which would result in a poor installation of the wall system. At this time,

floor-to-ceiling measurements should be taken at enough points to ensure correct installation of full-height frames.

3.02 Installation

- A Lay out partitions. Securely attach floor and ceiling runners. Accurately plumb strut studs at door openings and ULTRAWALL terminals.
- B Install ULTRAWALL panels, studs and trim members in accordance with USG Interiors, Inc. installation directions. Complete installation with vinyl base, door frames and trim.
- C Erect partitions to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. Adjust all hardware to proper working order.

DONN High Performance Wall System

Part 1—General

1.01 Related Work

- A Related work specified elsewhere:
1. Conventional door and glass frames: Section ____.
 2. Wood doors: Section ____.
 3. Glazing: Section ____.
 4. Finish hardware: Section ____.
 5. Painting: Section ____.

1.02 System Description

- A Interior wall system: Fully relocatable and point accessible. System consists of a framing system that will accept metal-faced and gypsum panels. Metal-faced and gypsum panels are interchangeable and may be applied adjacent to each other. System also provides door and glass frames, trims and base.

1.03 Quality Assurance

- A Wall system components shall be sourced from one manufacturer which certifies that materials meet or exceed these specifications.
- B Installing contractor: Installer shall have a history of completed jobs of similar size and scope. Contractor shall be registered and authorized by the manufacturer.
- C Sound transmission: Provide independent laboratory certification that wall system provides: ____ STC gypsum partitions, and ____ STC metal-faced partitions in accordance with ASTM E90.
- D Fire protection: When required on drawings, provide independent laboratory certification that wall system has been successfully tested for 1-hour fire endurance and hose-stream in accordance with ASTM E119.
- E Structural: Provide transverse load rating and impact resistance tests. Metal-faced panels shall be capable of supporting 1,000-lb. shelf load within the span of one panel without fastening standards to the framing system.

1.04 Submittals

- A Samples: Submit finish and color samples.
- B Manufacturer's data called for in quality assurance section and finish performance data per Section 2.02B.

- C The partition contractor shall submit shop drawings for assemblies or conditions not fully described on working drawings.

1.05 Environmental Conditions

- A Temperature within the building shall be above a constant minimum of 65°F with relative humidity not over 70% during erection of a partition. When required, heat shall be furnished by the general contractor. Erection of the partition systems shall not begin until building exterior provides complete protection from the outside weather. Panels shall not be stored where they are subjected to temperature, moisture or humidity extremes.

1.06 Delivery, Storage and Handling

- A Prefinished materials shall arrive at job site in their original unopened cartons or other protective packaging necessary to protect finishes. Materials should be stored in such packages until time of application. Bulk items (studs and tracks) shall arrive in banded bundles for ease of handling and distribution. Panels shall arrive and remain on adequate support to ensure flatness and prevent damage.

Part 2—Products

2.01 Manufacturer

- A DONN High Performance Wall System as manufactured by USG Interiors, Inc., Chicago, IL.

2.02 Materials

- A Framing:
1. Studs shall be 2" deep as indicated on drawings, punched for utility passage, and designated to accept metal-faced or gypsum panels. Studs shall lock to ceiling runner with a stud extender that allows up to 1½" in floor variation.
 2. Spacer channels shall be designed to lock studs in place, support electrical devices, carry power for signal cables, and provide abuse resistance for the panel surface.
 3. Ceiling track shall be designed to stabilize the wall at the ceiling, cover the tops of the panels, and integrate with full-height door and glass framing.

B Panels:

1. Gypsum panels shall be ½" x 48" or ¾" x 24", 30" or 48". Panels shall be predecorated in manufacturer's standard vinyl or fabric. Panels shall be bevel-edged for uniform joint appearance.

2. Metal-faced panels:

- a Metal-faced panels shall be ½" or ¾" thick by 24" or 30" wide with gypsum core, plain-backed.
- b Metal-faced panels shall be available in the following finishes:
 1. Painted
 2. Vinyl
 3. Porcelain chalkboard
 4. Stainless steel
 5. Fabric
- c Finish performance data per the following schedule shall be made available prior to bid:
 1. Hardness (ASTM D3363)
 2. Adhesion (ASTM D3359)
 3. Scratch resistance (Hoffman)
 4. Abrasion resistance (ASTM D658)
 5. Impact resistance (ASTM D2794)
- d Metal-faced panel shall incorporate a panel bottom channel to add strength and to secure snap-on base.

C Glazing components:

- Throated steel glazing components shall be available to be installed without regard to module.

D Door frames:

- Throated steel door frames shall be available to be installed without regard to module. In the 6'8" and 7'0" configuration, frames shall be nonhanded, reversible, and carry a 1-1½-hour Class B fire rating. Throated door frames shall have achieved a slam test of one million cycles. Throated frames shall be formed of steel. Frames shall be mortised for 1½" pair of 4½" x 4½" butt hinges and standard A-115.1 strike unless otherwise noted on drawings. Full-height frames shall interface with ceiling runner and be mortised for two pair of 4½" x 4½" butt hinges.

- E Glazing and door frames shall be prefinished in manufacturer's standard color.

- F Snap-on vinyl base shall be ¾" high. Color of base shall be from manufacturer's standard colors.

G Trims:

1. Trims shall be selected from manufacturer's standard paint colors.
2. Outside corners shall be available in square-edge or radiused configurations to match panel finish.

Part 3—Execution

3.01 Inspection

- A Before stocking or installing materials, the contractor should inspect the building site to verify that floors and ceilings contain no defects which would result in a poor installation of the wall system. At this time, floor-to-ceiling measurements should be taken at enough points to ensure correct installation of full-height frames.

3.02 Installation

- A Install partition framing and panels after floor coverings and suspended acoustical ceilings have been installed. Coordinate partition work with work of other trades which in any way affect partition installation. Avoid damage to installed work.
- B Furnish and install anchoring devices required, and secure partitions to floor and ceiling using concealed fastening devices which will not mar surfaces, such as clips and VELCRO® tape or foam tapes. Penetrating fasteners required only at door frames, finished ends, corners, glazing or where structurally necessary.
- C Install partitions rigid, level, plumb and in alignment with all components secured together, in accordance with manufacturer's instructions. Leave partitions complete, thoroughly clean, and in perfect condition.
- D Provide through posts to ceiling or other concealed supports, if required to assure lateral stability of partition runs.
- E Adjust hardware and leave doors in proper operating condition.

For additional specifications and technical information, contact your USG Interiors sales representative.

For further information . . .

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Note: All products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

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Interiors from every angle.™

USG Interiors, Inc.
101 South Wacker Drive
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USG Interiors, Inc.

DONN Access Floor Systems



USG



Table of Contents

SOLIDFEEL II System	4
All-Steel System	6
TUF- FLO II Panel	6
WOOD-COR, WOOD-LOK and Mark 30 Systems	8
Understructures	10
Seismic Applications Guides	10
Floor Covering Options	12
Air Distribution Systems	14
Wiring Distribution Systems— SERVICENTER Outlets	16
Accessories	17
Architectural Specifications	18

Floors that support today's business environment

DONN® access floors include a wide variety of systems to meet your specific design requirements. They deliver the flexibility needed to take advantage of current technology, as well as superior load bearing strength, utility maintenance, and air distribution services.

Many different DONN access floor systems are available for office buildings, computer rooms and specialty applications. This publication is designed to help you select the system best suited to each job.

Office systems Access floor systems are the ideal choice for new or renovated office space. They conceal and manage cables, wires and other services, yet remain flexible enough to adapt quickly and easily to changing furniture and equipment layouts. Access floors allow office space to be rearranged with minimal disruption and expense, by in-house personnel, over the lifetime of a building.

Computer room systems DONN access floor systems from USG Interiors stand up to heavy rolling loads of computer paper and electrical equipment plus various levels of concentrated loads. They help expedite upgrading, rearrangement and repair of computer equipment and services. They also control air distribution and conceal and manage cables, wires and other services. DONN access floor systems can be custom designed to place panels with different load characteristics exactly where they are needed within the same understructure. Rigid Grid systems for computer rooms provide an exceptionally high degree of stability and accessibility.

DESIGNAID cost analysis This computerized cost comparison program analyzes true costs for access floors versus costs for underfloor duct, cellular deck, flat wiring, powerpoles and other wiring distribution systems. It also compares mechanical ductwork costs for ceiling air distribution versus the cost of underfloor air distribution. Using your figures (for both systems under consideration) it calculates material, labor and installed costs, depreciation, tax credits and move costs, cash flow and total life cycle costs for both systems. The program also

supplies complete scale drawings of the proposed floor systems, including all components, accessories, wiring patterns and enlargements of pertinent details.

Eclat automated product information system The Eclat electronic catalog displays written descriptions, technical drawings and photographs of DONN access floors on a personal computer screen. The architect, designer or specifier can then electronically copy text and graphics into his or her word processing program for immediate use as product descriptions for clients or specification documents to accompany building plans. The Eclat catalog is stored on CD-ROM discs and updated quarterly.



USG Interiors is the first interior building systems manufacturer to participate in the Eclat system.

USG Interiors, Inc. USG Interiors is one of the world's largest commercial interior construction products companies. Continuing a tradition of superior products, systems and customer service, USG Interiors brings inventive, exciting offerings for ceilings, walls and floors.

DONN Access Floor Systems are manufactured in Red Lion, Pennsylvania. Along with USG Interiors wall and ceiling systems, they are displayed at The Solutions Center in Chicago, Illinois.



Ultimate strength and performance for offices and computer rooms

- Combines the strength of steel with a cementitious core.
- Lightweight core material improves rolling load performance.
- This exceptionally strong panel offers extra resistance against top sheet deformation.
- Improved structural and acoustical performance give quiet comfort and a solid, rigid feel underfoot.
- Recommended for high-traffic areas and heavy rolling loads.

Quality construction endures over the lifetime of your building

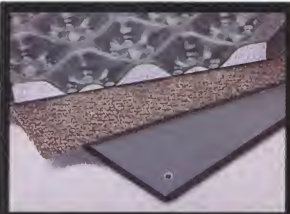
- SOLIDFEEL II panel is precision-formed into a pattern of 25 square pockets with additional support structures.
- Unitized panel construction gives maximum strength. Each panel is welded in 160 locations for improved performance.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.
- Panel is available with patented Designer Integral Trim or UNITRIM on DONN HPL.

- Integral Trim is machined from the DONN HPL panel surface, for a stronger and more permanent edge. Integral Trim won't crack, chip or fall off like add-on trim. Its finer module line is half the width of add-on trim, for improved visual appeal.
- Panel is ink-coded with performance information for easy identification and stamped "Made in U.S.A."

Flexibility to meet specific design requirements

- SOLIDFEEL II panels are interchangeable with All-Steel panels. They can be placed strategically where extra load or acoustical performance is needed in an All-Steel system.
- SOLIDFEEL II panels are also interchangeable with TUF-FLO II panels to provide high capacity airflow (check variations in panel height and thickness of floor coverings).
- Office systems utilize CORNERLOC or FreeStanding understructures.
- Computer room systems utilize Edge Support Rigid Grid, SNAP-LOC or FreeStanding understructures.
- Systems for seismic zones are listed on pages 10 and 11.
- The complete SOLIDFEEL II product line includes extra heavy-duty system consisting of SF-2000 panel with Edge Support Rigid Grid understructure and heavy-duty pedestal assembly.

Combines
high strength
for best
structural
performance
with quiet
comfort
underfoot.





Analyze the structural performance needed; then select the combination of panel and understructure that achieves the required values.

System Panel	Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)	Recommended Finished Floor Height
SF-800	CORNERLOC	600	800	2300	100	Up to 24"
SF-800	FreeStanding	600	800	2400	100	Up to 18"
SF-800	Edge Support Rigid Grid	600	800	3000	100	Up to 36"
SF-1000	CORNERLOC	800	1000	3000	125	Up to 24"
SF-1000	FreeStanding	800	1000	3300	125	Up to 18"
SF-1000	Edge Support Rigid Grid	800	1000	3500	125	Up to 36"
SF-1000	SNAP-LOC	800	1000	3400	125	Up to 24"
SF-1250	CORNERLOC	1000	1250	3200	150	Up to 24"
SF-1250	FreeStanding	1000	1250	3400	150	Up to 18"
SF-1250	Edge Support Rigid Grid	1000	1250	4200	150	Up to 36"
SF-1250	SNAP-LOC	1000	1250	3500	150	Up to 24"
SF-1500	CORNERLOC	1200	1500	3500	175	Up to 24"
SF-1500	Edge Support Rigid Grid	1200	1500	5000	175	Up to 36"
SF-1500	SNAP-LOC	1200	1500	4000	175	Up to 24"
SF-2000	Edge Support Rigid Grid	2000	2000	6000	200	Up to 36"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

Provides a wide range of rated systems to meet the needs of all general office projects plus computer room high-traffic areas.

Economical high performance and strength for computer rooms and offices

- Lighter weight makes All-Steel panels easy to install and reconfigure.
- Durable steel construction makes panels easy to cut. All-Steel panels are ideal for cable cutouts.
- Recommended for normal load requirements.

Steel construction offers permanent strength, stability and tailored appearance

- Each All-Steel panel is welded in 140 locations for improved load resistance and efficient dispersal of load.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.

- Panel is available with patented Designer Integral Trim or UNITRIM on DONN HPL. Static Conductive HPL and Vinyls are also available.
- Integral Trim is machined from the DONN HPL panel surface, for a stronger and more permanent edge. Integral Trim won't crack, chip or fall off like add-on trim. Its finer module line is half the width of add-on trim, for improved visual appeal.
- Panel is ink-coded with performance information for easy identification and stamped "Made in U.S.A."

System flexibility meets a wide variety of architectural and mechanical requirements

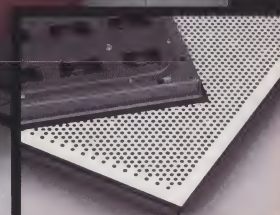
- All-Steel panels are interchangeable with SOLIDFEEL II panels.
- Computer room systems utilize Edge Support Rigid Grid, SNAP-LOC or FreeStanding understructures.
- Office systems utilize CORNERLOC or FreeStanding understructures.
- Systems for seismic zones are listed on pages 10 and 11.

Interchangeable with TUF-FLO II perforated panels to provide high-capacity airflow for computer room applications

- TUF-FLO II perforated panels have 25% open area for maximum airflow and low noise levels.
- Optional galvanized damper allows easy adjustment of airflow from top of panel.
- Perforations form symmetrical pattern. Surface is DONN HPL or conductive vinyl.
- Designer Integral Trim is available on TUF-FLO II panels with DONN HPL.
- Unitized panel construction gives high structural performance.
- 1,000 lb. and 1,250 lb. concentrated load ratings are available.
- TUF-FLO II panels are also interchangeable with SOLIDFEEL II panels (check variations in panel height and thickness of floor coverings).

Rugged, unitized construction forms strong, lightweight panels for ease of maintenance and dust-free environment.





Full line of
performance-
rated systems
with Integral
Trim laminate
improves
appearance and
eliminates edge
problems.

Analyze the structural performance needed; then select the combination of panel and understructure that achieves the required values.

System Panel	Understructure	Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)	Recommended Finished Floor Height
All-Steel System						
AS-1000	CORNERLOC	400	1000	2600	100	Up to 24"
AS-1000	FreeStanding	400	1000	3000	100	Up to 18"
AS-1000	Edge Support Rigid Grid	400	1000	4400	100	Up to 36"
AS-1000	SNAP-LOC	400	1000	3100	100	Up to 24"
AS-1250	CORNERLOC	500	1250	2800	110	Up to 24"
AS-1250	FreeStanding	500	1250	3500	110	Up to 18"
AS-1250	Edge Support Rigid Grid	500	1250	4700	110	Up to 36"
AS-1250	SNAP-LOC	500	1250	3800	110	Up to 24"
AS-1500	CORNERLOC	600	1500	3000	120	Up to 24"
AS-1500	Edge Support Rigid Grid	600	1500	4900	120	Up to 36"
AS-1500	SNAP-LOC	600	1500	4000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISC Testing Standards. For higher finished floor heights, contact USG Interiors.

TUF-FLO II Perforated Panel

Static Pressure (Inches of H ₂ O)	.05	.075	0.1	0.15	0.2
CFM* with Damper	380	466	540	660	762
CFM* without Damper	510	625	722	885	1022

*Cubic feet per minute. ETL-certified test data.

WOOD-COR—Most economical solution to access floor requirements of computer rooms

- Provides excellent insulation and sound qualities for user comfort.
- Meets Class A fire rating per ASTM E84.
- Recommended for normal load requirements.

Steel and wood particleboard construction

- Galvanized steel completely encases the wood particleboard core for improved load performance.
- Superior bonding with urethane adhesives.
- WOOD-COR panels are available with static conductive DONN HPL.
- Edge trim is mechanically locked to panel edges and fitted at the corners.
- Panel is ink-coded with performance information for easy identification and stamped "Made in U.S.A."

Interchangeable with Perforated Air Panel

- Perforated Air Panel has 25% open area for maximum air-flow and low noise levels.
- Optional galvanized damper allows easy adjustment of air-flow from top of panel.
- Perforated Air Panel has 1,000 lb. concentrated load rating.

Variety of available under-structures

- Three WOOD-COR understructures (WOOD-COR Edge Support Rigid Grid, Snap-Loc and FreeStanding) meet varying load and access requirements for computer room applications (see page 11).

WOOD-LOK—Most economical solution to access floor requirements of offices

- Lightweight construction of WOOD-LOK panels features galvanized steel completely encasing a high-grade particleboard core for deflection resistance and quiet comfort.
- Meets Class A fire rating per ASTM E84.
- Panel is ink-coded with performance information for easy identification and stamped "Made in U.S.A."

Steel-encased particleboard panel with understructure provides economical performance.



Analyze the structural performance needed; then select the combination of panel and understructure that achieves the required values.

System		Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)	Recommended Finished Floor Height
Panel	Understructure					
WOOD-COR System						
WC-1000	Edge Support Rigid Grid	800	1000	2800	120	Up to 36"
WC-1000	SNAP-LOC	600	1000	2200	120	Up to 24"
WC-1000	FreeStanding	600	1000	2000	120	Up to 18"
WOOD-LOK System						
WL-1000	WOOD-LOK	600	1000	2000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISC Testing Standards. For higher finished floor heights, contact USG Interiors.

MARK 30 SYSTEM

Mark 30—The traditional choice for computer room access floor panels

- Mark 30 panels offer strong, lightweight, all steel construction in a unique radial rib design.
- Edge trim for 1/8" HPL is mechanically locked to panel edges and fitted at the corners.
- Durable, conductive epoxy paint finish resists abrasion and dissipates static electricity.
- Panel is made in the U.S.A. and identified with performance information.

Interchangeable with Mark 30 Perforated Panel

- Optional galvanized damper allows easy adjustment of air-flow from top of panel.
- Edge trim for 1/8" HPL is mechanically locked to panel edges and fitted at the corners.
- Mark 30 Perforated Panel has 1,000 lb. concentrated load rating.

Variety of available under-structures

- Two Mark 30 understructures (Mark 30 Edge Support Rigid Grid and SNAP-LOC) meet varying load and access requirements for computer room applications (see page 11).

Analyze the structural performance needed; then select the combination of panel and understructure that achieves the required values.

System			Rated Rolling Load (Lbs.)	Rated Concentrated Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)	Recommended Finished Floor Height
Panel	Understructure	Application					
Mark 30 System							
MK-1250	Mark 30 Rigid Grid		500	1250	2500	120	Up to 36"
MK-1250	Mark 30 SNAP-LOC		500	1250	2500	120	Up to 24"
MK-1500	Mark 30 Rigid Grid		600	1500	3000	120	Up to 36"
MK-1500	Mark 30 SNAP-LOC		600	1500	3000	120	Up to 24"

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards. For higher finished floor heights, contact USG Interiors.

Radial rib panel design to ideally match traditional, existing installations.

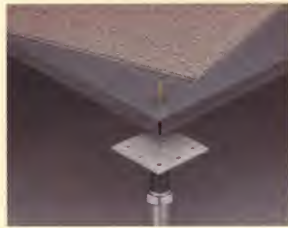


ALL-STEEL AND SOLIDFEEL PANELS

CORNERLOC Understructure

Mechanically fastens each floor panel to a pedestal at all four corners, ensuring rigidity, lateral stability

- Fasteners securely lock down panels, providing firmness and quiet comfort.
- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights from 6" to 24".



Low-Loc Pedestal Assembly

Same features as CORNERLOC understructure but can be used with finished floor heights as low as 3-5" with less vertical adjustment.



Edge Support Rigid Grid Understructure

Withstands high lateral forces caused by intermittent starting and stopping of heavy rolling loads

- Recommended in 2'x4' and 4'x4' basket-weave configurations. Also available in 2'x2' grid.
- Factory-applied gasket on stringer gives bonded material a tighter seal and improved sound control.
- Gravity-lock collar on pedestal assures system levelness.
- Stringers support each edge of panel. Basketweave configuration of stringers ensures maximum lateral stability in all directions.
- Stringers are capable of supporting 450 lbs. at mid-span with 0.010" permanent set.
- Recommended for finished floor heights up to 36".



FreeStanding Understructure

Provides easier access to the underfloor plenum

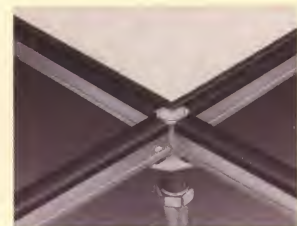
- Special trapezoid-shaped flanges on pedestal head hold panels in place and provide panel edge support.
- Pedestal head is constructed of die-cast aluminum.
- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights up to 18".



SNAP-LOC Understructure

Recommended for less severe concentrated and rolling load applications

- Stringers snap on and off without tools.
- Stringer covers provide improved sound control.
- Gravity-lock collar on pedestal assures system levelness.
- Recommended for finished floor heights up to 24".



Each pedestal base assembly is readily identified with "USG—Made in the U.S.A." to make future changes easier.

Seismic Applications for Office Systems (For use with all USG Interiors panel/systems)

Understructure Pedestal Base Assembly	Seismic Zones 0, 1, 2A, 2B	Seismic Zone 3	Seismic Zone 4
CORNERLOC	6"-24"	6"-20"	6"-16"
1" diameter tube	finished	finished	finished
4"x4"x1/4" baseplate	floor height	floor height	floor height
FreeStanding	6"-18"	6"-12"	6"-12"
1" diameter tube	finished	finished	finished
4"x4"x1/4" baseplate	floor height	floor height	floor height

Based on UBC Code-1988 for general office applications. For higher finished floor heights and other code requirements, contact USG Interiors.

WOOD-COR, WOOD-LOK AND MARK 30 PANELS

Wood-Cor Rigid Grid Understructure

- Bolted stringers of 6' and 2' lengths improve lateral stability
- Stringers support panels along their entire perimeter.
 - Stringers are covered with conductive vinyl to provide panel alignment and sound control.
 - Also available with all 2' stringers.
 - Gravity-lock collar on pedestal assures system levelness.
 - Recommended for finished floor heights up to 36".



Wood-Cor SNAP-LOC Understructure

- Designed for less severe WOOD-COR applications
- Roll-formed, galvanized steel stringers come in 2' lengths with vinyl covers for sound control and panel alignment.
 - Gravity-lock collar on pedestal assures system levelness.
 - Spring-action connection on pedestal cap allows stringers to connect without fasteners and to be removed quickly without tools.
 - Recommended for finished floor heights up to 24".



Wood-Cor FreeStanding Understructure

- Designed for finished floor heights up to 18"
- Stringerless pedestals allow fast, easy access.
 - Pedestal head has panel locating tabs.
 - Gravity-lock collar on pedestal assures system levelness.



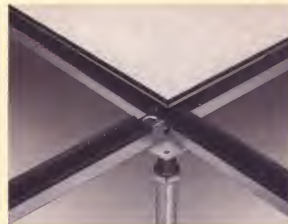
Wood-Lok Understructure

- Locks each floor panel directly to pedestal head at all four corners with corner fasteners
- Provides quiet, stable system.
 - Gravity-lock collar on pedestal assures system levelness.
 - Recommended for finished floor heights up to 24".



Mark 30 Rigid Grid Understructure

- Most laterally stable understructure for Mark 30 system
- Bolted stringers of 6' and 2' lengths improve lateral stability.
 - 2' stringer cover adds sound control and provides an air seal between the panel and stringer.
 - Gravity-lock collar on pedestal assures system levelness.
 - Recommended for finished floor heights up to 36".



Mark 30 SNAP-LOC Understructure

- Designed for less severe concentrated and rolling load applications using Mark 30 system
- A spring action connection on the die-cast aluminum pedestal cap allows stringers to be connected without fasteners and to be removed quickly without tools.
 - 2' stringer cover adds sound control and provides an air seal between the panel and stringer.
 - Gravity-lock collar on pedestal assures system levelness.
 - Recommended for finished floor heights up to 24".



Seismic Applications for Computer Rooms (For use with all USG Interiors panel/systems)

Understructure Pedestal Base Assembly	Seismic Zones 0, 1	Seismic Zone 2A	Seismic Zone 2B	Seismic Zone 3	Seismic Zone 4
Edge Support Rigid Grid 1" diameter tube 4"x4"x 1/4" baseplate	6"-30" finished floor height	6"-28" finished floor height	6"-22" finished floor height	6"-15" finished floor height	6"-12" finished floor height
Edge Support Rigid Grid 1 1/2" swaged tube 5"x5"x 1/4" baseplate	31"-36" finished floor height	29"-36" finished floor height	23"-34" finished floor height	16"-28" finished floor height	13"-24" finished floor height
Edge Support Rigid Grid 1 1/2" swaged tube 6"x6"x 3/8" baseplate	N/A	N/A	35"-36" finished floor height	29"-36" finished floor height	25"-36" finished floor height

Based on UBC Code-1988 for computer room applications. For higher finished floor heights and other code requirements, contact USG Interiors.

Designer Integral Trim

Static-control High Pressure Laminate (HPL) with patented Integral Trim comes in five designer color patterns.

Integral Trim is machined from the HPL itself, eliminating the need for separate pieces, to give a stronger, more permanent edge. Integral Trim won't crack, chip or fall off like add-on trim. Plus its finer module line is half the width of add-on trim, for

improved visual appeal.

Integral trim HPL has the same electrical performance as DONN HPL.

DONN HPL Patterns with Designer Integral Trim

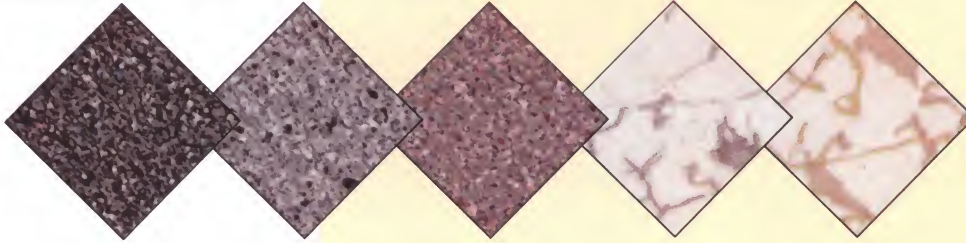
Constellation

Misty

Sandpiper

Greystone

Beigetone



DONN Static-Control HPL Coverings

DONN HPL surfaces, in seven standard patterns, provide high wear resistance, efficient static control and attractive appearance. They meet major computer industry surface to ground

resistance specifications (5×10^5 ohms min. to 2×10^{10} ohms max.). Two thicknesses, $\frac{1}{16}$ " and $\frac{1}{8}$ ", are available ($\frac{1}{16}$ " is recommended for most applications, offering cost savings without compromising wear, appearance or performance).

UNI-TRIM protective edging is sonically welded for durability.

DONN HPL Patterns with UNI-TRIM

Grey Matrix

Beige Matrix

Grey Kontrac

Beige Kontrac

Whitetone

Greystone

Beigetone



Static-Conductive Coverings

These coverings are constructed with special built-in materials for static-conductive surfaces required in clean rooms and other high-technology areas.

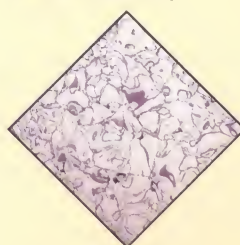
They meet NFPA Standard 99, which requires surface to ground resistance for 2.5×10^4 ohms min. to 1×10^6 ohms max. Static decay rate as measured by Federal Test Method 101,

Method 4046, is .05 seconds or less.

Conductive HPL and Conductive Vinyl Coverings

Off White HPL

Marbleized White Vinyl



These color reproductions show colors that are as close as possible within printing limitations to actual products. For actual production material, see HPL sample chips offered by your USG Interiors representative.

For additional technical information on laminate floor coverings, contact your USG Interiors representative or call 1-800-522-3666.

Carpeting

DONN access floor panels are offered with laminated, factory-applied carpet in two designs, MEGATREND CG® multilevel loop pile and COLOURS CG® cut pile. EDGELOC® urethane unitary backing on both styles prevents carpeting from unraveling at panel edges. Carpet is provided by J&J Industries in six standard colors. Carpeted panels come without edge trim for a monolithic appearance.

Both carpet designs have been performance-tested for heavy-duty commercial applications. MEGATREND CG is made of CAMALON® yarn, designed for heavy wear and easy maintenance. It is ideally suited for areas subject to heavy traffic and dirt. MEGATREND CG is solution-dyed for superior color fastness in unlimited dye lot sizes.

COLOURS CG is made of 100% COMMERCIALON®, designed for superior bulk and resiliency as well as easy maintenance. It is Beck-dyed for color consistency. CAMALON and COMMERCIALON yarns are both soil-hiding, advanced-generation nylon with a 10-year warranty.

MEGATREND CG and COLOURS CG are static-dissipative carpets designed for electronically sensitive applications such as modern electronic offices, control rooms and computer rooms. Carpeting meets major computer industry surface resistance specifications; assures 2.0 KV or less static generation as tested under AATC-134-1979. Carpeting also has passed NBS Aminco Smoke Chamber test (450 or less) and Radiant Panel Class 1 (institutional, health and commercial) at greater than 0.45

watts/cm².

For technical information and color selections covering J&J Industries and/or other USG approved carpeting, contact your USG Interiors representative or call 1-800-522-3666.



MEGATREND CG multilevel loop pile (24 oz.)



COLOURS CG cut pile (30 oz.)



Accessible underfloor air distribution is an excellent way to provide environmental control factors such as air conditioning, humidity control and ventilation, which are critical to higher levels of comfort and increased productivity for office workers. Benefits include:

- Uniform air delivery
- Economical construction
- Energy savings
- Lower operating costs
- Reduced drafts and noise
- Fast installation
- Improved air quality
- Easy maintenance

For airflow data, refer to the DONN Air Distribution Control Plenum System catalog, SA-1029, in Section 10270 of Sweet's Mechanical Engineering and Retrofit File.

INTERIOR ZONE APPLICATIONS **Krantz KB-200 Diffuser**

Material—All components are high-impact poly-carbonate Makrolon 94-15 manufactured by Mobay Chemical Co.

Compliance—Injection-molded, self-extinguishing material complies with UL-94 and ASTM D635-74 criteria.

Color—Standard: light gray. Other colors are available to match or complement carpet tile colors and patterns.

Outlets—Floor outlets feature angular slots that twist air exiting the diffuser in a radial fashion to achieve a high 6 to 1 induction rate.

Air Temperature—Plenum supply air may be introduced into the room at 62-65° F for air conditioning versus 55-58° F for ceiling diffusers.

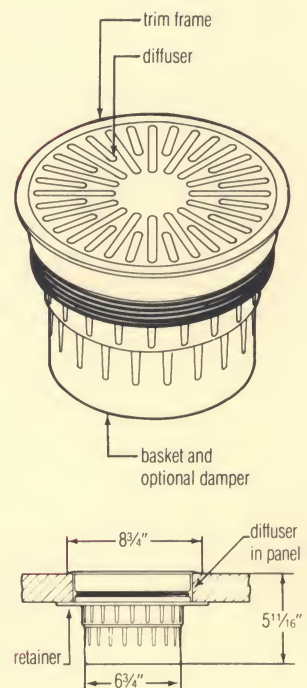
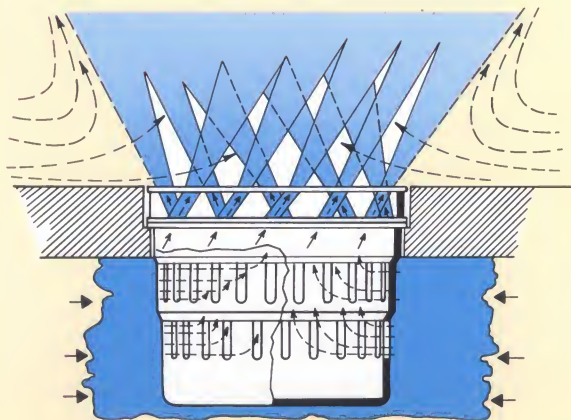
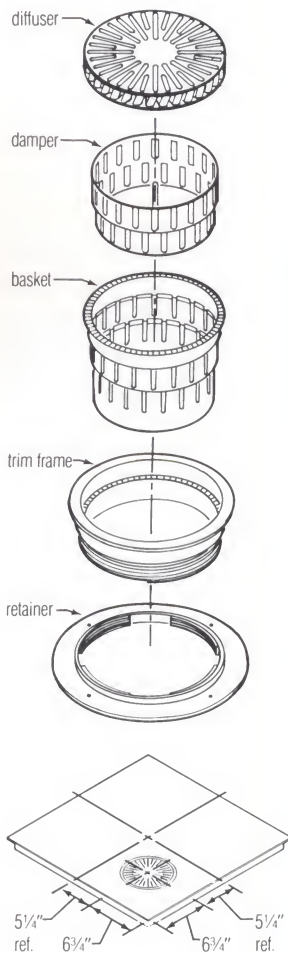
Air Flow—Air flow per KB-200 diffuser outlet can vary from 75 to 100 cfm depending on static pressure within the Control Plenum System.

Damper—An optional damper is readily installed within the basket for additional air control.

Maintenance—Assembly includes the radial angular slot diffuser together with a dirt-collecting basket that can be easily removed for cleaning.

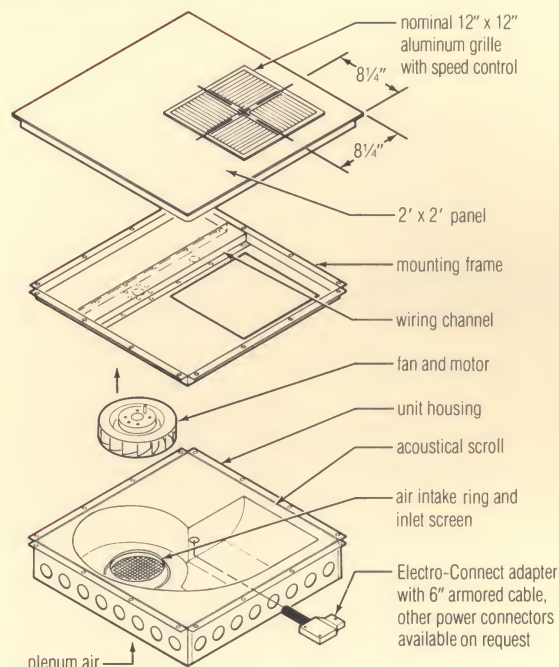
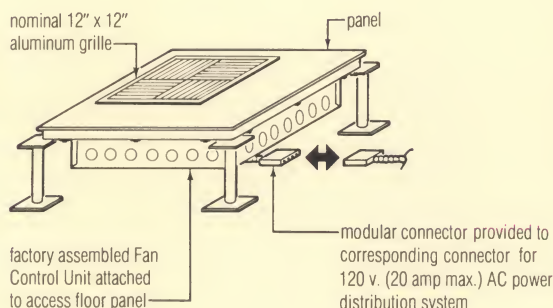
Installation

1. Panel can be supplied with factory cutout at location shown in drawing. Field cutout size for KB-200 diffuser: $8\frac{1}{16}$ " dia. $\pm \frac{1}{32}$ ".
2. Trim frame is placed in cutout and secured to panel with retainer.
3. Panel assembly is installed in floor.
4. Basket, damper (optional) and diffuser are inserted into outlet.



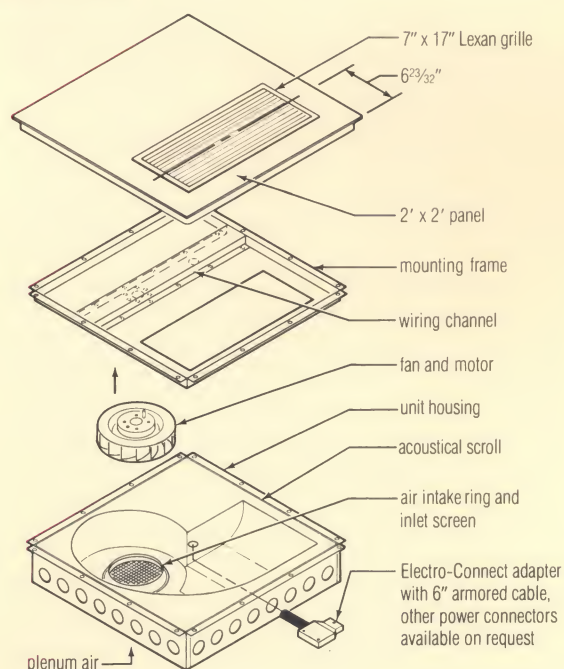
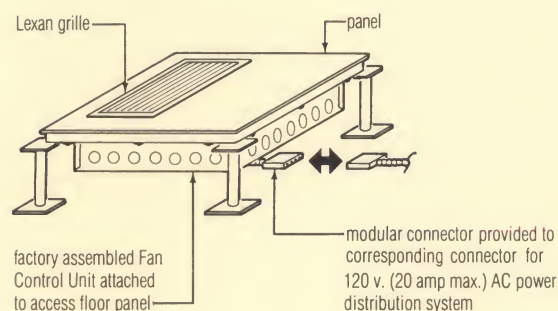
INTERIOR ZONE APPLICATIONS **DONN Fan Control Unit with 4-Way Diffuser Aluminum Grille**

For interior zones with varying thermal conditions, such as workstations and/or conference rooms. Built-in fan speed control can be adjusted from top of panel for additional comfort control. Has four adjustable grille components for directional control.



PERIMETER ZONE APPLICATIONS **Fan Control Units with Linear Air Grille**

For perimeter zones having high and/or variable thermal conditions. Designed for SOLIDFEEL II and WOOD-LOK panel/systems.



Components

Housing—Galvanized steel housing is attached to underside of panel with 12 #8x 1/2" hex washer-head self-drilling screws.

Fan Assembly—45-watt, 115-volt, 1500-rpm motor powers a backward-curved impeller fan

that is shielded by inlet screen.

Fan assembly is secured to mounting frame.

Power Connector—Unit is provided with modular wiring adapter for ease of installation and relocation. The external adapter is connected by branch cable to 120-volt/20-amp AC power supply.

Installation

1. Fan Control Units are provided factory-installed to appropriate 24"x24" DONN access floor panels. They are shipped to job-site as a complete assembly.
2. Keep underside of Fan Control Unit (max. 5 7/8" depth) free of any obstructions. Maintain

- minimum 2" vertical space between subfloor and inlet.
3. Connect factory installed ELECTRO-CONNECT® adapter for 120-volt AC power supply to flexible wiring system. Other adapter/connectors are available.
4. Install complete assembly into access floor system.

SERVICENTER OUTLETS

SERVICENTER outlets bring all electrical and data communication services from the control plenum to the work area for user convenience. These outlets and related panels can be quickly installed or moved by in-house personnel as needed. Four types of SERVICENTER outlets meet specific performance and budget requirements.

For more information, refer to the DONN Wiring Distribution Control Plenum System catalog, SA-1028, in Section 10270 of Sweet's Electrical Engineering and Retrofit File.



Double Lid/Box Specification Grade SERVICENTER

Double lid version of expanded box accommodates additional electrical, data, and telecommunication services

- Two compartments and lids to separate power and communication services.

- Or, both compartments available to accommodate four 20 amp/120V duplex receptacles.
- Accommodates 6" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN® lids snap off for easy maintenance.

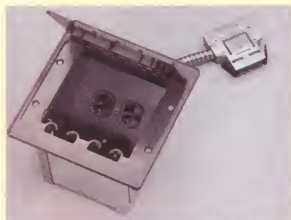
Specification Grade SERVICENTER

The most versatile box for electrical and telecommunication needs

- Can be factory-wired with modular wiring (UL listed E 63807) or field-wired with metal-clad or armored cable (UL listed E 75945).

- Modular wiring connections at box allow quick, easy relocation. ELECTRO-CONNECT® system is standard; other wiring systems are available.
- Interface plates accommodate electrical and local area networking (LAN).
- Two 20 amp/120V duplex receptacles are standard.

- One- or two-circuit wiring is available.
- Accommodates 6" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lid snaps off for easy maintenance.
- Heavy duty construction withstands momentary concentrated loads up to 1000 lbs.



Commercial Grade SERVICENTER

Can be used with SERVICENTER Specification Grade to separate power and communication services; can also be used as a compact box for electrical or telecommunication needs

- Can be factory-wired with modular wiring (UL listed E 63807) or field-wired with metal-clad or armored cable (UL listed E 75945).
- Modular wiring connections at box allow quick, easy relocation. ELECTRO-CONNECT system is standard; other wiring systems are available.
- Provided with two interface plates for mounting of data cables.
- One 20 amp/120V duplex receptacle is standard.
- One- or two-circuit wiring is available.
- Accommodates 4" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lid snaps off for easy maintenance.
- Also available in double lid version.



SERVICENTER Component Assembly

Provides economical unit for 120V service and pass-through wiring

- Wrapper assembly accepts standard 4"-square junction box for field wiring.
- Accommodates 6" (min.) finished floor height.
- Galvanized steel construction; load-resistant hinged LEXAN lid snaps off for easy maintenance.



LEXAN Plastic Grille One-piece, molded grille in gray color, ideal for carpeted panels

- Electrically nonconductive material eliminates need for isolation band used with metal grilles.
- LEXAN 500—UL fire-rated, test method 94 V-0.
- Supports rolling and concentrated loads up to 1000 lbs.
- 51 sq. in. open area for improved air volume.
- Six manually adjusted dampers for airflow control.



Cutout Cable cutouts for wiring access can be either factory-supplied or field-cut and trimmed.

Grommet Heavy-duty 4½"-diameter plastic grommets prevent damage to wires pulled through cutouts.



Panel Lifters Easy lifting of panels from understructure

- Double Cup Panel Lifter for HPL panels.
- Double Pin Lifter for carpet-covered panels.



Detailed specifications for your specific project are available on request. These specifications are computer generated to meet your exact needs. For technical service, call USG Interiors Access Floor Systems at 1-800-522-3666.

In addition, following are typical examples of specifications for office and computer room access floors. For offices, SOLIDFEEL II panels with a CORNERLOC understructure are specified. For computer rooms, All-Steel panels with an Edge Support Rigid Grid understructure are specified.

Part 1—General

1.01 Description of Work

- A** Work in this section includes, but is not limited to: access floor panels, floor coverings, understructure and various electrical, data, communication and structural accessories.
- B** Related work specified elsewhere:
 - 1 Concrete: Division 3.
 - (a) Cast-in-place concrete shall be within 1" of specified height and shall not vary more than 1/4" in 10".
 - (b) Concrete sealer shall be Euco Floor Coat, CLEARBOND or an approved equal that is compatible with access floor pedestal adhesive.
 - (c) Depressed slab, if specified, shall be compatible with access floor.
 - 2 Finishes: Division 9, reference paragraph 2.02B.
 - (a) Tile: Section 09300.
 - (b) Carpet: Section 09680.
 - 3 Mechanical: Division 15. Assure compatibility of installation details with access floor.
 - 4 Electrical: Division 16. Electrical contractor shall connect access floor to building ground as specified in paragraph 3.3 C.

1.02 System Description

- A** Access floor system shall consist of nominal 24" square, modular panels supported by and secured to appropriate understructure.
- B** All components of the access floor system are to be of steel construction except for panel-cementitious core, surfacing pads between panel and supports.
- C** Panels shall be easily removable

by one person with standard tools and a lifting device and shall be interchangeable except where cut for special conditions.

- D** Stringers shall be easily removable without the use of special tools. Fasteners for stringer attachment shall be accessible from the top surface of the stringer.
- E** Complete floor system shall be sturdy, rigid and free of overall rocking, rattles, squeaks and noises. The finished floor shall be level within $\pm 0.100"$ and shall be level within $\pm 0.062"$ in any 10' direction.
- F** Quantities, finished floor height (FFH) and location of accessories shall be as specified on the contract drawings.
- G** System shall be electrically conductive for dissipation of static while having enough electrical resistance to provide protection against electrical shock.

1.03 Quality Assurance

- A** Manufacturer shall have a 10 year history of successful projects of similar size and complexity. All structural access floor components shall be supplied by one manufacturer to ensure compatibility. Products shall be manufactured and identified "Made in U.S.A."
- B** Contractor shall be approved by the manufacturer, use manufacturer-approved service personnel and shall have a history of five years of successful projects of similar size and complexity.
- C** Method for testing concentrated, ultimate and rolling loads of access floor panels shall be in accordance with the CISC Standard Test Procedure and shall be performed by an independent testing laboratory regularly engaged in the testing of access floor systems and components.
- D** Method for testing resistance of the access floor system shall be in accordance with NFPA No. 99, Chapter 3, modified, when maintaining the room at $45\% \pm 5\%$ relative humidity.
- E** Panels without covering shall have a Class A flame spread rating when tested in accordance with ASTM E 84-81a.
- F** Access floor shall be capable of resisting the horizontal force (Fp) in accordance with the current Uniform Building Code standards for a(n) _____ (building type: office, computer room, hospital, school, etc.) in seismic

zone _____. (Applies to seismic zones 2, 3 and 4 only. Consult your USG Interiors representative or Technical Services for recommended values.)

1.04 Sequencing/Scheduling

- A** A pre-job conference to establish schedule, review shop drawings and coordinate trades must be attended by the general contractor, the access floor contractor, the mechanical contractor, the electrical contractor, and all others whose work may be affected by the access floor system.
- B** Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- C** Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system.
- D** Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.

1.05 Submittals

- A** Manufacturer qualifications.
- B** Contractor qualifications.
- C** Certification that material and installation are in accordance with the specification.
- D** Test reports by an independent testing laboratory certifying that component parts perform as specified.
- E** One each of the following are to be submitted for review as specified: floor panel, pedestal and service outlet.
- F** Shop drawings of panel layout shall include railings, steps and ramp locations with details of assembly components, anchoring methods, perimeter conditions, service boxes, cutouts, grounding methods and interfaces with other conditions.

1.06 Delivery and Placement

- A** Materials shall be delivered in original, unopened packages clearly labeled with the manufacturer's name and item description.
- B** Material packages shall be distributed around the areas where they will be used to avoid overstressing the subfloor and to facilitate installation.

1.07 Project Conditions

- A** General contractor shall provide secure storage and a clean subfloor which is free of dust, construction debris and other trades during the installation of access floor.

- B** Building shall be enclosed and the temperature shall be maintained between 40° F and 90° F.

Part 2—Products

2.01 Manufacturer

The access floor system shall consist of panels and compatible understructure designed and manufactured by USG Interiors, Inc., Access Floor Systems, Red Lion, PA.

Office Systems

2.02 Materials

- A** Floor panels:
 - (1) Panels shall be welded steel components with an enclosed bottom pan formed in a uniform pattern of square pockets. The unitized panels shall be internally filled with a lightweight cementitious material to improve sound characteristics and to provide performance values as specified.
 - (2) Chipboard or particleboard material is unacceptable.
 - (3) Panels shall be protected against corrosion internally with a phosphate coating and externally with a conductive epoxy coating applied in an immersion dip process.
 - (4) Panel assembly shall include four fasteners for attachment to the panel.
 - (5) Panels shall be identified with manufacturer's name, model number, load rating and "Made in U.S.A."
- B** Floor covering: Panels shall be supplied bare with carpet tiles to be furnished and field installed by others.
Note: Contact your USG Interiors representative for recommendations of suitable carpet tile materials.
- C** Pedestals for Seismic Zones 0, 1, 2A and 2B:
For floor heights from 6" to 24":
 - (1) Pedestal assemblies shall be all-steel welded construction, corrosion resistant and capable of supporting a 5,000 lb. load without permanent deformation of any part.
 - (2) Pedestal head shall be galvanized, die-cut steel welded to a 7/8-14 UNF threaded tube with a leveling nut and a gravity-activated metal locking collar. Pedestal head assembly shall provide vibration-proof leveling in increments of 0.012" and an overall height adjustment of 2".
 - (3) Pedestal base shall consist of a galvanized steel tube,

identified as "Made in U.S.A.", with a minimum wall thickness of 0.060" welded to a 4"-square, 1/8"-thick galvanized steel base plate.

- (4) Pedestals shall be secured to subfloor with Bogart 282 or DAP 2000 adhesive or approved equal.
- (5) Pedestal assemblies adhered to unsealed concrete subfloor shall be capable, without panels in place, of resisting a 1,000 in-lb. overturning moment without failure of adhesive or any part of the pedestal.

For floor heights under 6" or higher than 24", and Seismic Zones 3 and 4, contact your USG Interiors representative.

D Accessories:

- (1) Service outlets shall be provided at locations detailed on the contract drawings. Outlets shall be UL-listed access floor boxes capable of accommodating power, signal and communications cables. The service outlet shall be a drop-in design having a hinged LEXAN lid with cable hooks and capable of supporting a 1000-lb. concentrated load.
- (2) Provide manufacturer's standard steps, ramps, handrails, fascia plate, expansion joints, perimeter ledge support, cove base and/or access holes with grommets where indicated on the contract drawings.
- (3) Provide manufacturer's standard lifting device compatible with the panel.

- E Maintenance materials: provide the following spare materials: panels, pedestals, service outlets, and panel lifting devices.

2.03 Office System

- A Structural performance: The Panel/CORNERLOC system shall perform as indicated below.

Panel System Type	Rated Rolling Load (Lbs.)	Rated Conc. Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)
SF-800	600	800	2300	100
SF-1000	800	1000	3000	125
SF-1250	1000	1250	3200	150
SF-1500	1200	1500	3500	175

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards.

- B Electrical resistance: Panel-to-understructure (metal-to-metal) connections shall provide less than 10 ohms resistance without grounding clips.

Computer Room Systems

2.02 Materials

A Floor panels:

- (1) Panels shall be 24"-square, all-steel, unitized, welded construction with a minimum of 140 welds and a uniform bottom pan pattern of formed modular pockets to resist deflection anywhere on the panel.
- (2) Chipboard or particleboard material is unacceptable.
- (3) Panels shall be protected against corrosion inside and out with a conductive epoxy coating applied in an immersion dip process.
- (4) Panel trim shall be integral to the high pressure laminate (HPL). Separate trim pieces are not acceptable.
- (5) Panels shall be identified with manufacturer's name, model number, load rating and "Made in U.S.A."

B Floor covering: Panels shall be surfaced with HPL, high wear type, grade HW 62 (0.060"), conforming to NEMA LD3-1985 standards.

Note: Contact your USG Interiors representative for availability of other surface coverings.

C Pedestals for Seismic Zones 0, 1, 2A and 2B:

For floor heights from 6" to 24":

- (1) Pedestal assemblies shall be all-steel welded construction, corrosion resistant and capable of supporting a 5,000 lb. load without permanent deformation of any part.
- (2) Pedestal head shall be die-cut steel welded to a 7/8-14 UNF threaded tube with a leveling nut and a gravity-activated metal locking collar. Pedestal head assembly shall provide vibration-proof leveling in increments of 0.012" and an overall vertical height adjustment of 2".
- (3) Pedestal base shall be a galvanized steel tube, identified as "Made in U.S.A.", with a minimum wall thickness of 0.060" welded to a 4"-square, 1/8"-thick galvanized steel base plate.
- (4) Pedestal assemblies adhered to subfloor, without panels or stringers in place, shall be capable of resisting a 1,000 in-lb. overturning moment without failure of adhesive or any part of the pedestal.
- (5) Pedestals shall be secured to subfloor with Bogart 282 or DAP 2000 adhesive or

approved equal.

For floor heights under 6" or higher than 24", and Seismic Zones 3 and 4, contact your USG Interiors representative.

D Stringers

- (1) Stringers shall support each edge of panel.
- (2) Stringers shall be galvanized steel and capable of supporting a 450-lb. load on 1 sq. in. at the center of a 21 1/2" span with a permanent set not to exceed 0.010".
- (3) Stringers shall have conductive material for sound deadening and plenum seal.
- (4) Stringers shall be individually and rigidly fastened to the pedestal with one 1/2" bolt for each foot of stringer length. Bolts shall provide positive electrical contact between the stringers and pedestals. Connections depending on gravity or spring action are unacceptable.

- (5) Stringer grid shall be 4' stringers in a basketweave configuration ensuring maximum lateral stability in all directions. (Also available in 2' x 4' and 2' x 2' stringer systems.)

E Accessories:

- (1) Airflow panels (with or without dampers) shall be interchangeable with solid panels and shall be provided as specified on the contract drawings. Panels shall have approximately 25% open area and deliver 540 CFM at 0.100" static pressure with damper full open (or 722 CFM at 0.100" static pressure without damper). Panels shall be capable of supporting a 1,000-lb. (or 1,250-lb.) concentrated load. Dampers, if provided, shall be adjustable from the top surface of each panel at a centrally located control.
- (2) If required, LEXAN grilles with adjustable dampers shall be provided in the locations detailed on contract drawings. Grilles shall deliver 468 CFM at 0.100" static pressure and shall be able to support a 1,000-lb. concentrated load.
- (3) Service outlets shall be provided at locations detailed on the contract drawings. Outlets shall be UL-listed access floor boxes capable of accommodating power, signal and communications

cables. The service outlet shall be a drop-in design having a hinged LEXAN lid with cable hooks and capable of supporting a 1000-lb. concentrated load.

- (4) Provide manufacturer's standard steps, ramps, handrails, fascia plate, expansion joints, perimeter ledge support, cove base and/or access holes with grommets where indicated on the contract drawings.

- (5) Provide manufacturer's standard lifting device compatible with the panel.

- F Maintenance materials: provide the following spare materials: panels, pedestals, service outlets, and panel lifting devices.

2.03 Computer Room System

- A Structural performance: The Panel/Edge Support Rigid Grid system shall perform as indicated below.

Panel System Type	Rated Rolling Load (Lbs.)	Rated Conc. Load (Lbs.)	Rated Ultimate Load (Lbs.)	Impact Load (Lbs.)
AS-1000	400	1000	4400	100
AS-1250	500	1250	4700	110
AS-1500	600	1500	4900	120

Rated system loads shown are recommended by USG Interiors and tested in accordance with CISCA Testing Standards.

B Electrical resistance:

- (1) The resistance of the access floor system shall be between 5.0×10^5 and 2.0×10^{10} ohms measured from the floor covering to the pedestal.
- (2) Panel-to-understructure (metal-to-metal) contacts shall have not more than 10 ohms resistance. Continuity clips shall be installed as required.

Part 3—Execution

3.01 Inspection

- A Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean and dry.
- B Concrete sealers, if used, shall be identified and proven to be compatible with pedestal adhesive. If other than USG Interiors recommended adhesives or sealers are used, verify that adhesive achieves bond to slab before commencing work.

- C** Verify dimensions on contract drawings, including level of interfaces such as abutting floor, ledges and door sills.

3.02 Installation

- A** Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- B** Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.
- C** Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations.
- D** No dust- or debris-producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.
- E** Subfloor shall be kept broom clean as installation progresses.
- F** Partially complete floors shall be braced against shifting to maintain integrity of the installed system.
- G** Additional pedestals as needed shall support panels where floor is disrupted by columns, walls and cutouts.
- H** Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.
- I** Finished floor shall be level, not varying more than 0.062" in 10' or 0.100" overall.
- J** Installed system shall be free of vibration, rocking, rattles, squeaks and other unacceptable performance.
- K** Plenum dividers shall be accurately scribed and fit to the subfloor and sealed with mastic to ensure maintenance of plenum effect.
- L** Facia:
- (1) Shall be accurately scribed and fit to subfloor and adjacent finished floor.
 - (2) Set in mastic and seal if required for plenum effect.
- M** Cutouts:
- (1) Make cutouts required for services penetrating panels.
 - (2) Seal edges with grommets, plastic trim, molding and/or gaskets.

- N** Acceptance: General contractor shall accept floor in whole or part prior to allowing use by other trades.

3.03 Cleaning, Protection and Grounding After Completion of Installation—By Others

- A** Vacuum clean the entire system.
- B** Before any equipment is moved across the access floor, it shall be protected by ½" plywood.
- C** Electrical contractor shall connect the access floor to building ground as follows: Three 12 AWG bare grounding wires, one on each quarter line of the installation, shall run the width of the building and be attached to every fourth pedestal. Another wire shall connect these wires to each other and to the building ground.

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For further information on these products, contact:

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Red Lion, PA 17356
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USG Interiors, Inc.
30-30 Thomson Ave.
Long Island City, NY 11101
(718) 937-7744

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USG Interiors, Inc.

101 South Wacker Drive
Chicago, Illinois 60606-4385

USG Interiors, Inc.

SA-905

Ceiling Systems



USG

STANDARD COLORS FOR CEILING PANELS AND SUSPENSION SYSTEMS



Canyon (067)



Desert Rose (091)



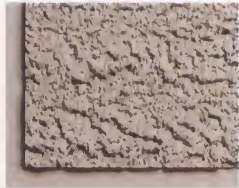
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Beige (142)



Sunset (100)



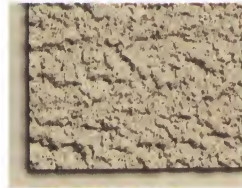
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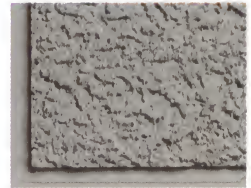
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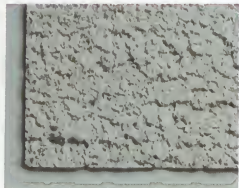
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Parchment (103)



Willow (073)



Aquamarine (081)



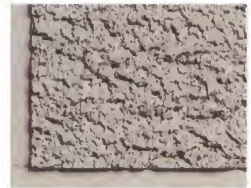
Taupe (107)



Sandstone (090)



Alabaster (104)



Silvertone (052)



Manila (246)



Fawn (181)



Melon (646)



Straw (143)



Ice Blue (093)



*Caramel (144)**



*Cranberry (099)**



*Brownstone (075)**



*Black (005)**

CONTRASTING FINISHES FOR SUSPENSION SYSTEMS

Two shades of white and six contrasting finishes (not shown) are available as standard products. For swatches of these finishes, refer to the Up With Color Selector, or contact your USG Interiors representative.

White (004)
Flat White (050)
Brass (065)
Bronze (033)
Chrome (066)

Silver Satin (002)
Tierra Brown (092)
Woodgrain (034)

**Deeptone colors.*

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UP WITH COLOR USG Interiors features 24 fresh, modern colors on selected acoustical panels and tile. Or any custom color can be produced on request. For design integrity, the same 24 standard colors are available on most DONN® suspension systems. As with panels, grid colors can be custom matched.

Product color is of the highest quality. ACOUSTONE® panels are colored clear through to mask surface scratches. Color compatibility extends to contemporary treatments for walls, furniture and fabrics, offering the perfect ceiling solution for unique, carefully planned interiors.

Color samples to meet project needs are free upon request. Call 1-800-USG-7272 toll-free for immediate service. In Minnesota call 218-879-2800.

Color Uniformity: Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings is within normally accepted commercial tolerance.

Substrate texture, room lighting and subjectivity of observer can affect perceived color of ceiling material. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton) to minimize the effect.

These color reproductions show colors that are as close as possible within printing limitations to actual products. For a more representative match to actual production material, see ACOUSTONE and AURATONE® product samples offered by your USG Interiors sales representative.

Cover Photo: Frost Renditions panels/CENTRICITEE suspension

TABLE OF CONTENTS

Color

Color Choices for Acoustical Ceilings 2

Selection Chart

Acoustical Performance 4

Frost Renditions, ECLIPSE and ORION Panels & Tile

Frost Renditions 5

ECLIPSE Ceilings 6

ORION® Ceilings 8

ACOUSTONE Panels & Tile

LINEAR EXPRESSIONS 10

Fine Textured 11

Rough Textured 13

PEDESTALS 14

Scored 14

Medium Textured 16

AURATONE Panels & Tile

PEDESTALS and PROFILE Series 18

DESIGNER Ceiling Series 20

The ILLUSION Ceiling Series 22

Design Textured and Natural Textured 24

Extra Sound Absorbent 26

Random Fissured 27

Light Fissured 28

Directional Fissured 29

Perforated 30

Special Function Panels & Tile

Abuse Resistant 32

PREMIER Glass Fiber 33

Gypsum Ceiling Panels 34

Clean Room Ceilings 35

Environment Resistant 36

DONN Ceiling Suspension Systems

Exposed and Concealed Suspensions 38

Environmental and Drywall Suspensions 38

Wall Angles and Moldings 40

Panel and Tile Edges/Suspension Details 40

Integrated Ceilings

Luminous and Reflective Ceilings 42

Linear Metal Ceilings 42

SILENT COLLECTION Walls and Ceilings 42

Integrated Panel/Grid Systems 42

Technical Information

Test Data 44

Test/Performance Standards & Agencies 45

UL Fire-Rated Designs 46

Light Fixture Protection 48

Plenum Sound Barriers 48

Good Design Practices 49

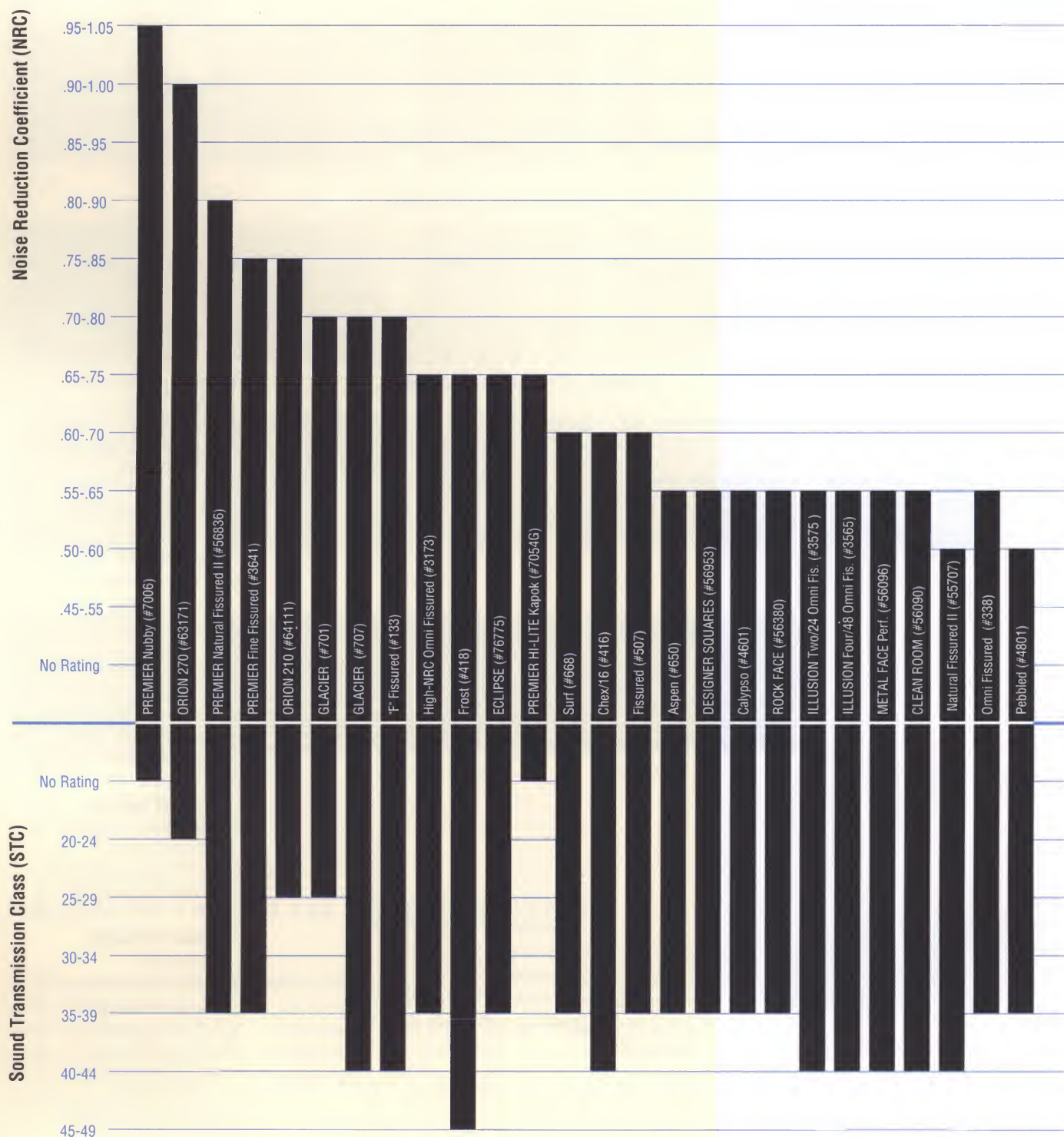
Limitations 49

Architectural Specifications 50

Product Index

Alphabetical List of Patterns 51

This chart provides peak acoustical ratings for a sampling of our most popular panels. For more information, refer to individual product descriptions on pages 6-36.



New, softly delineated Frost Renditions ceilings combine a sense of perfect measurement with beautiful light texture. Renditions panels are etched with delicate, triple-routed scoring which is enhanced by narrow, $\frac{1}{16}$ " CENTRICITEE grid. Precise, stylized corner treatments and chiseled straight lines on our Frost surface exceed the beauty of conventionally routed modular products. Panels can be arranged in an infinite number of ways, producing classically proportioned designs or intricate etched patterns.

- Renditions I: refined beveled corners
- Renditions II: contemporary square corner design created by non-intersecting etched lines
- Renditions III: rounded corners punctuated by skip scoring and concentric dots
- Renditions IV: boldly perforated accent panel repeating the dots featured on Renditions III



Frost Renditions panels/CENTRICITEE suspension

RENDITIONS I

RENDITIONS II

RENDITIONS III

RENDITIONS IV

Frost Renditions I

Colors—White plus 24 colors

Frost Renditions II

Colors—White plus 24 colors

Frost Renditions III

Colors—White plus 24 colors

Frost Renditions IV

Colors—White plus 24 colors

Frost Renditions Straight Line

Colors—White plus 24 colors

Recommended Suspensions

- Fineline Edge
- CENTRICITEE
- FINELINE®
- Fineline 1/8



Esthetic opportunities and technological advances combine in nondirectional ECLIPSE fine texture ceiling panels. With an elegant texture and a design built to perform, ECLIPSE offers an unmatched combination of fire resistance and sound control.

These panels also provide superior dimensional stability, allowing for installation in the early stages of construction, even in areas where intermittent heating and cooling may occur. The outstanding product formulation withstands temperature and humidity conditions of 90°F/90% RH without visible sag. In fact, ECLIPSE'S sag resistance has a 10-year warranty.

Finally, its thermal resistance R-factor, (at 75°F mean temperature), is 2.78 for the 3/4" panels while surface burning characteristics are flame spread 25/smoke developed 25. All this makes ECLIPSE the perfect combination of beauty and technology.

ECLIPSEColor—White³*Recommended Suspensions*

Square Edge

• DX®, DXL

• CENTRICITEE

• MERIDIAN®

Shadowline Tapered (SLT) Edge

• DX, DXL

Interline Tapered (ILT) Edge

• CENTRICITEE

• MERIDIAN

Fineline Edge

• FINELINE

• Fineline 1/8

• Highline

Bevel Edge Standard Kerf Tile

• DX Concealed



Size	Edge ¹	Regular			FIRECODE®		
		Item No.	NRC Range	STC Range ²	Item No.	NRC Range	STC Range ²

ECLIPSE**Panels**

2' x 2' x 3/4"	Square	76575	.65-.75	35-39	76579	.55-.65	35-39
2' x 4' x 3/4"	Square	78575	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	SLT	76775	.65-.75	35-39	76779	.55-.65	35-39
2' x 4' x 3/4"	SLT	78775	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	ILT	76075	.65-.75	35-39	76079	.55-.65	35-39
2' x 4' x 3/4"	ILT	78075	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	Fineline	76975	.65-.75	35-39	76979	.55-.65	35-39
2' x 4' x 3/4"	Fineline	78975	.65-.75	35-39	N/A	—	—

Tiles

12" x 12" x 3/4"	BESK	70073	.65-.75	25-29	70074	.60-.70	25-29
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(1) For edge drawings, see page 40.

(2) STC 40-44 available on request.

(3) Also, see sales representative for availability of specific colors.



210, 220, 230 VINYL
270 NUBBY

ORION ceiling panels with light textured vinyl or high quality fabric laminates feature all the technological advantages of ECLIPSE panels, including sag and fire resistance, dimensional stability, and excellent acoustics. Thermal resistance R-factors (at 75°F mean temperature), are 1.79 (½" panels), 2.78 (¾" panels) and 3.70 (1" panels). Surface burning characteristics are flame spread 25/smoke developed 30 (ORION 210, 220 and 230), 20/5 (ORION 270).

ORION 210

Color—White

ORION 220

Color—White

ORION 230

Color—White

ORION 270

Color—White

		Regular			FIRECODE		
Size	Edge¹	Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range
ORION 210							
Panels							
2' x 2' x ½"	Square	62111	.70-.80	20-24	N/A	—	—
2' x 2' x ¾"	Square	N/A	—	—	66118	.70-.80	25-29
2' x 4' x ½"	Square	64111	.70-.80	20-24	N/A	—	—
2' x 4' x ¾"	Square	N/A	—	—	68118	.70-.80	25-29
20" x60" x ¾"	Square	67511	.70-.80	20-24	N/A	—	—
4' x 4' x1"	Square	63411	—	20-24	N/A	—	—
ORION 210 UNPERFORATED							
Panels							
2' x 4' x ½"	Square	64112			N/A	—	—
ORION 220							
Panels							
2' x 2' x ½"	Square	62121	.70-.80	20-24	N/A	—	—
2' x 2' x ¾"	Square	N/A	—	—	66128	.70-.80	25-29
2' x 4' x ½"	Square	64121	.70-.80	20-24	N/A	—	—
2' x 4' x ¾"	Square	N/A	—	—	68128	.70-.80	25-29
ORION 230							
Panels							
2' x 2' x ½"	Square	62131	.70-.80	20-24	N/A	—	—
2' x 2' x ¾"	Square	N/A	—	—	66138	.70-.80	25-29
2' x 2' x 1"	Square	64131	.70-.80	20-24	N/A	—	—
2' x 2' x ¾"	Square	N/A	—	—	68138	.70-.80	25-29
ORION 270							
Panels							
2' x 2' x ¾"	Square	66171	.80-.90	25-29	66178	.70-.80	25-29
2' x 4' x ¾"	Square	68171	.80-.90	25-29	68178	.70-.80	30-34
2' x 2' x 1"	Square	61171	.90-1.00	25-29	N/A	—	—
2' x 4' x 1"	Square	63171	.90-1.00	25-29	N/A	—	—
2' x 2' x ¾"	Shadowline	66271	.80-.90	25-29	66278	.75-.85	25-29
2' x 2' x 1"	Shadowline	61271	.85-.95	25-29	N/A	—	—
2' x 2' x ¾"	Fineline	66371	.80-.90	25-29	66378	.75-.85	25-29
2' x 2' x 1"	Fineline	61371	.85-.95	25-29	N/A	—	—
STC ORION 270							
Panels With Backing							
2' x 2' x ¾"	Square	66175	.75-.85	35-39	66179	.70-.80	35-39
2' x 4' x ¾"	Square	68175	.75-.85	35-39	N/A	—	—
2' x 2' x 1"	Square	61175	.80-.90	35-39	N/A	—	—
2' x 4' x 1"	Square	63175	.80-.90	35-39	N/A	—	—
2' x 2' x ¾"	Shadowline	66275	.70-.80	40-44	66279	.70-.80	35-39
2' x 2' x 1"	Shadowline	61275	.80-.90	40-44	N/A	—	—
2' x 2' x ¾"	Fineline	66375	.70-.80	40-44	66379	.70-.80	35-39
2' x 2' x 1"	Fineline	61375	.80-.90	40-44	N/A	—	—

(1) For edge drawings, see page 40.

Recommended Suspensions
Square Edge

- DX, DXL
- CENTRICITEE
- MERIDIAN

Shadowline Edge

- DX, DXL

Fineline Edge

- CENTRICITEE
- MERIDIAN
- FINELINE
- Fineline 1/8
- Highline

ACOUSTONE natural textured ceiling panels and tile offer unsurpassed esthetics and superb acoustics. These are the highest quality mineral fiber ceiling products available in the industry. Each molded unit is uniquely patterned, which provides a natural look and avoids a repetitive, machine-made appearance. ACOUSTONE panels and tile are colored clear through, so that surface scratches will be virtually invisible. The full line of 24 colors is available on most patterns. Flame spread and thermal properties for ACOUSTONE products are excellent. Surface burning characteristics for class A products are flame spread 25; smoke developed 20. ACOUSTONE FIRECODE products achieve fire ratings up to 2 hours. Thermal resistance R-factor (at 75°F mean temperature) is 2.12. Because of their aluminum foil backing, ACOUSTONE products also resist soiling.



Surfaces inspired by linear patterns in nature.
Textures and selected natural colors blend
beautifully with natural design settings.
Especially compatible with stone, marble and
other earth-hewn design materials.

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

RANDOM

Panels

2' x 2' x 3/4"	Shadowline	434	.55-.65	40-44	439	.55-.65	35-39
2' x 2' x 3/4"	Fineline	435	.55-.65	40-44	N/A	—	—

WIDE

Panels

2' x 2' x 3/4"	Shadowline	431	.55-.65	35-39	438	.55-.65	35-39
2' x 2' x 3/4"	Fineline	433	.55-.65	35-39	N/A	—	—

(1) For edge drawings, see page 40.

RANDOM

WIDE

Random

Colors—White plus 24 colors

Wide

Colors—White plus 24 colors

Recommended Suspensions

Shadowline Edge

• DX, DXL

Fineline Edge

• CENTRICITEE

• FINELINE

• Fineline 1/8

• MERIDIAN

• Highline



LINEAR EXPRESSIONS Random panels/CENTRICITEE suspension

New Sandrift ceiling panels feature a light, subtle texture, excellent acoustics and proven durability. This richly etched, natural texture has a unique, tactile character. Sandrift panels are available in White plus the complete selection of 24 colors.

- Sandrift: intriguing, subtle texture

Size	Edge ¹	Regular		STC Range	FIRECODE		
		Item No.	NRC Range		Item No.	NRC Range	STC Range

SANDRIFT

Panels

2' x 2' x 3/4"	Shadowline	808	.65-.75	40-44	815	.65-.75	40-44
2' x 2' x 3/4"	Fineline	809	.65-.75	40-44	N/A	—	—

(1) For edge drawings, see page 40.

SANDRIFT

Sandrifft

Colors—White plus 24 colors

Recommended Suspensions

- Shadowline Edge
- DX, DXL
- Fineline Edge
- CENTRICITEE
- MERIDIAN
- FINELINE
- Fineline 1/8
- Highline



FROST

Delicate surface texture, designed to create subtle, tasteful ceilings. Available in 24 colors.

- Frost: tightly textured for a soft, light look

Size	Edge ¹	Regular	NRC Range	STC Range	FIRECODE	NRC Range	STC Range
		Item No.			Item No.		

FROST

Panels

2' x 2' x 3/4"	Square	412	.65-.75	35-39	413	.65-.75	35-39
2' x 2' x 3/4"	Shadowline	414	.65-.75	40-44	415	.65-.75	40-44
2' x 2' x 3/4"	Fineline	418	.65-.75	40-44 ²	N/A	—	—
2' x 2' x 3/4"	FL Bevel	419	.65-.75	40-44 ²	N/A	—	—

(1) For edge drawings, see page 40.

(2) STC 45-49 available on request.

Frost

Colors—White plus 24 colors

Recommended Suspensions

Square Edge

- DX, DXL

Shadowline Edge

- DX, DXL

Fineline Edge

- CENTRICITEE

- MERIDIAN

- FINELINE

- Fineline 1/8

- Highline



Frost panels/FINELINE suspension

ACOUSTONE ROUGH TEXTURED

Distinctive, rough textured panels and tile, available in 24 colors. Rich surface detail resembles natural sculptured stone. Enhances other natural materials such as wood, marble, quarried stone and glass block. Designed to create prominent, elegant ceilings.

- **GLACIER:** exceptionally deep, natural texture

Size	Edge ¹	Regular	NRC Range	STC Range	FIRECODE	NRC Range	STC Range
		Item No.			Item No.		
GLACIER							
Panels							
2' x 2' x 3/4"	Square	706	.70-.80	35-39	714	.65-.75	35-39
2' x 4' x 3/4"	Square	764	.70-.80	35-39	N/A	—	—
2' x 2' x 3/4"	Shadowline	707	.70-.80	40-44	715	.70-.80	35-39
2' x 4' x 3/4"	Shadowline	711	.70-.80	35-39	N/A	—	—
2' x 2' x 3/4"	Fineline	708	.70-.80	40-44 ²	N/A	—	—
Tile							
12" x 12" x 3/4"	Square Edge/Kerf	701	.70-.80	25-29	713	.75-.85	35-39

(1) For edge drawings, see page 40.

(2) STC 45-49 available on request.

(3) Tile available in white; also, see sales representative for availability of specific colors.

GLACIER

GLACIER

Colors—White plus 24 colors³

Recommended Suspensions

Square Edge

- DX, DXL

Shadowline Edge

- DX, DXL

Fineline Edge

- CENTRICITEE

- MERIDIAN

- FINELINE

- Fineline 1/8

- Highline

Square Edge Standard Kerf Tile

- DX Concealed



GLACIER panels/FINELINE suspension

Contemporary scored patterns, with fine textured Frost surface for great sound absorption. Standard panels are designed to incorporate narrow $\frac{1}{16}$ " grid into the overall ceiling design.

- PEDESTALS I and IV: triple step-cut 2' x 2' and 6" x 6" modules
- Chex/36: 4" x 4" squares
- Chex/4: classic 12" x 12" squares; available with classic GLACIER surface as well as Frost
- Chex/16: 6" x 6" squares, embellished with double reveals
- Checkmate: ideal for expansive ceilings
- Checkline: linear scored
- Many unique scored patterns can be quickly produced to your specifications

PEDESTALS

CHEX/36

CHEX/4

CHEX/16

CHECKMATE

CHECKLINE



Chex/16 panels/MERIDIAN suspension

Size	Edge ¹	Regular			Firecode		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PEDESTALS I

Panels

2' x 2' x 3/4"	Special	400	.65-.75	35-39	N/A	—	—
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PEDESTALS IV

Panels

2' x 2' x 3/4"	Special	404	.70-.80	35-39	N/A	—	—
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CHEX/36

Panels

2' x 2' x 3/4"	Special	436	.70-.80	40-44	N/A	—	—
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CHEX/4

Panels—Frost Surface

2' x 2' x 3/4"	Special	448	.60-.70	40-44	N/A	—	—
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Panels—GLACIER Surface

2' x 2' x 3/4"	Shadowline	748	.70-.80	40-44	N/A	—	—
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CHEX/16

Panels

2' x 2' x 3/4"	Special	416	.60-.70	40-44	N/A	—	—
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CHECKMATE

Panels

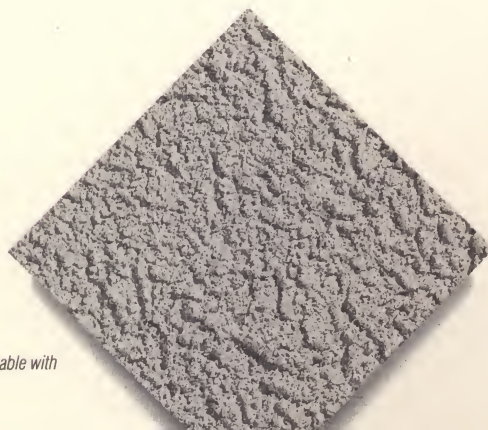
2' x 2' x 3/4"	Special	432	.55-.65	40-44	N/A	—	—
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CHECKLINE

Panels

2' x 2' x 3/4"	Special	427	.60-.70	40-44	N/A	—	—
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(1) For edge drawings, see page 40. Fineline edge is available on request.
 (2) See sales representative for availability of specific colors.



CheX/4 panels also available with GLACIER surface.

PEDESTALS I

Colors—White plus 24 colors

PEDESTALS IV

Colors—White²

CheX/36

Colors—White²

CheX/4—Frost

Colors—White²

CheX/16

Colors—White²

Checkmate

Colors—White²

Checkline

Colors—White²

Recommended Suspensions

- Special Edge
- CENTRICITEE
- MERIDIAN
- Shadowline Edge
- DX



A natural surface for versatile, moderately textured ceilings. Great sound ratings. Available in a wide selection of size and edge combinations.

- “F” Fissured: moderately planed, random fissures, for a natural-chiseled look

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

“F” FISSURED

Panels

2' x 2' x ¾"	Square	131	.65-.70	35-39	140	.65-.75	35-39
2' x 4' x ¾"	Square	135	.65-.75	35-39	N/A	—	—
2' x 2' x ¾"	Shadowline	132	.70-.80	40-44	141	.65-.75	40-44
2' x 4' x ¾"	Shadowline	136	.70-.80	40-44	N/A	—	—
2' x 2' x ¾"	Fineline	133	.70-.80	40-44	N/A	—	—

Tile

12" x 12" x ¾"	Square Edge/Kerf	101	.65-.75	30-34	138	.70-.80	35-39
12" x 12" x ¾"	Bevel Edge/Kerf	102	.65-.75	30-34	139	.70-.80	35-39

(1) For edge drawings, see page 40.

“F” FISSURED

“F” Fissured

Colors—White plus 24 colors

Recommended Suspensions

Square Edge

- DX, DXL

Shadowline Edge

- DX, DXL

Fineline Edge

- CENTRICITEE

- MERIDIAN

- FINELINE

- Fineline 1/8

- Highline

Square Edge Standard Kerf Tile

- DX Concealed

Bevel Edge Standard Kerf Tile

- DX Concealed



AURATONE PANELS AND TILE

For economical, sound-efficient ceilings, choose panels or tile from the water-felted AURATONE line. The water-felting process forms lightweight mineral fiber units that provide a superb balance of sound absorption and attenuation.

This versatile product line offers hundreds of design options. Dozens of texture possibilities—including rough, granular, smooth, faceted, perforated and fissured. Twenty-four colors available on most patterns add to the design possibilities. Sizes range from 12"x12" tile to 30"x60" panels.

Flame spread and thermal properties are excellent. AURATONE FIRECODE products achieve UL fire ratings up to 3 hours. Surface burning characteristics (flame spread/smoke developed) are 25/10 (15/10 for Natural Fissured II and Aurora FIRECODE products). Thermal resistance R-factors (at 75°F mean temperature) are 2.18 for $\frac{3}{4}$ " thick products, 1.85 for $\frac{5}{8}$ " thick products.

AURATONE ceilings resist soiling and, with optional plastic coating (white only), can be cleaned easily using only a damp sponge. The plastic coating has been Gardner-Scrubbability tested to 3000 cycles.

Precision face-cuts in elegant miniature patterns.
Scoring blends with CENTRICITEE and MERIDIAN grid.

- Nine/Two-24: nine linear bars, 24" long and 2" wide
- Sixteen/6: four quadrants cross-scored with $\frac{1}{16}$ " cuts; each quadrant cross-scored with $\frac{1}{4}$ " cuts into 6" x 6" squares
- Eighty-one/2: 2" x 2" squares in a $\frac{1}{16}$ " routing
- Sixty-four/3: four quadrants cross-scored with $\frac{1}{16}$ " cuts; each quadrant cross-scored with $\frac{1}{4}$ " cuts into 3" x 3" squares

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PROFILE SERIES

PROFILE Nine/Two-24 Panels

2' x 2' x $\frac{1}{2}$ "	ILT	5024	.30-.40	35-39	N/A	—	—
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PROFILE Sixteen/6 Panels

2' x 2' x $\frac{1}{2}$ "	ILT	5025	.30-.40	35-39	N/A	—	—
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PROFILE Eighty-one/2 Panels

2' x 2' x $\frac{1}{2}$ "	ILT	5026	.30-.40	35-39	N/A	—	—
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PROFILE Sixty-four/3 Panels

2' x 2' x $\frac{1}{2}$ "	ILT	5028	.30-.40	35-39	N/A	—	—
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(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

NINE/TWO-24

SIXTEEN/6

EIGHTY-ONE/2

SIXTY-FOUR/3

Nine/Two-24

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist²

Sixteen/6

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist²

Eighty-one/2

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist²

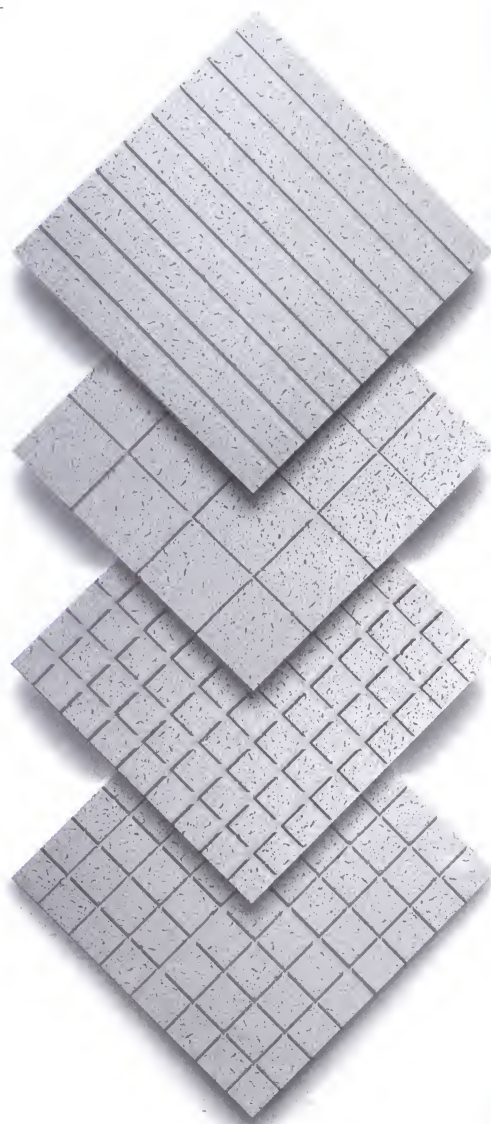
Sixty-four/3

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist²

Recommended Suspensions

Interline Tapered (ILT) Edge

- CENTRICITEE
- MERIDIAN



Triple step-cut panels with Fine Fissured surface.

Layered cuts blend with narrow $\frac{1}{16}$ " grid.

- PEDESTALS I: step-cut detailing only at panel edges
- PEDESTALS II: narrow proportioned 12" x 24" modules
- PEDESTALS IV: elegant 12" x 12" tile look
- PEDESTALS IX: smaller 8" x 8" modules
- PEDESTALS ILLUSIONS Two/24: Panels 2' x 2' panels look on 2' x 4' panels
- PEDESTALS ILLUSIONS Four/48: 48" x 6" linear strips
- PEDESTALS ILLUSIONS Eight/12: 12" x 12" tile look on 2' x 4' panels

Size	Edge ¹	Regular		FIRECODE		NRC Range	STC Range
		Item No.	NRC Range	Item No.	NRC Range		

PEDESTALS

PEDESTALS I Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3670	(2)	40-44	N/A	—	—
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PEDESTALS II Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3672	(2)	40-44	N/A	—	—
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PEDESTALS IV Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3674	(2)	40-44	N/A	—	—
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PEDESTALS IX Panels

2' x 2' x $\frac{3}{4}$ "	ILT	3679	(2)	40-44	N/A	—	—
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PEDESTALS ILLUSIONS Two/24 Panels

2' x 2' x $\frac{3}{4}$ "	ILT	4670	(2)	40-44	N/A	—	—
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PEDESTALS ILLUSIONS Four/48 Panels

2' x 2' x $\frac{3}{4}$ "	ILT	4672	(2)	40-44	N/A	—	—
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PEDESTALS ILLUSIONS Eight/12 Panels

2' x 2' x $\frac{3}{4}$ "	ILT	4674	(2)	40-44	N/A	—	—
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(1) For edge drawings, see page 40.

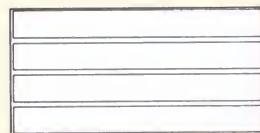
(2) Standard NRC range is .25-.35, NRC .55-.65 available on request.

(3) See sales representative for availability of specific colors.



ILLUSIONS Two/24

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³



ILLUSIONS Four/48

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³

I, II, IV, IX

TWO/24

FOUR/48

EIGHT/12

PEDESTALS I

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³

PEDESTALS II

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³

PEDESTALS IV

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³

PEDESTALS IX

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³

Recommended Suspensions

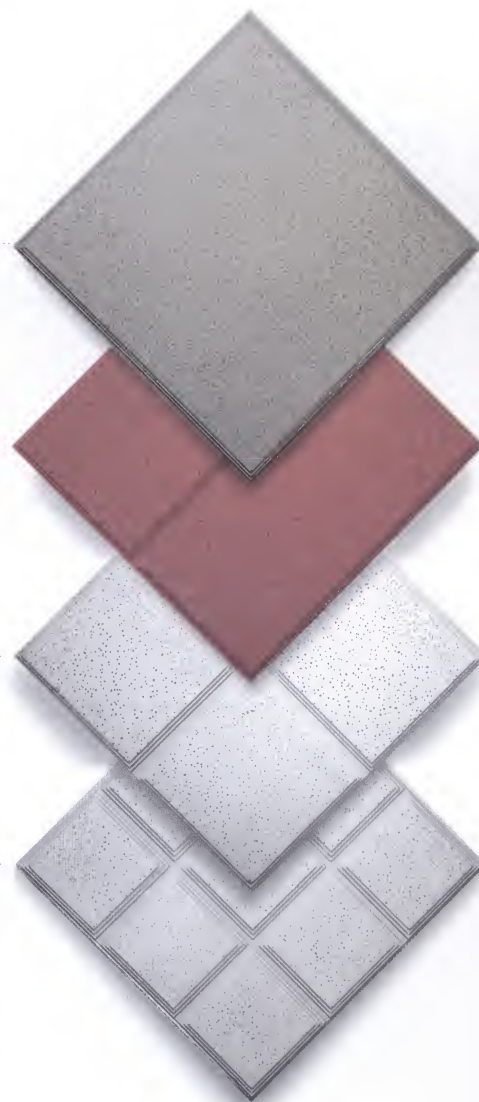
Interline Tapered (ILT) Edge

- CENTRICITEE
- MERIDIAN



ILLUSIONS Eight/12

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist³



Face-cut panels that update any room. Designed for use where a scored, geometric ceiling is desired. DESIGNER SQUARES come in one surface pattern, Natural Fissured II, with standard $\frac{1}{8}$ " and $\frac{3}{16}$ " face routings. PRISMS are available with Omni Fissured surface pattern.

- DESIGNER SQUARES I: thirty-six 3" x 3" squares
- DESIGNER SQUARES II: six 3" x 24" linear bars
- DESIGNER SQUARES III: twenty-five 4" x 4" squares
- DESIGNER SQUARES IV: eleven 1" x 24" linear bars
- PRISMS: faceted panels

Size	Edge ¹	Pattern	Regular			FIRECODE		
			Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

DESIGNER SQUARES

Panels								
2' x 2' x $\frac{3}{4}$ "	Shadowline, $\frac{1}{8}$ " routing	Natural Fissured II	56853	.55-.65	35-39	5662	.55-.65	35-39
	I	Fineline, $\frac{3}{16}$ " routing	56953	.55-.65	35-39	5663	.55-.65	35-39
2' x 2' x $\frac{3}{4}$ "	Shadowline, $\frac{1}{8}$ " routing	Natural Fissured II	56851	.50-.60	40-44	5664	.50-.60	40-44
	II	Fineline, $\frac{3}{16}$ " routing	56951	.50-.60	40-44	5665	.50-.60	40-44
2' x 2' x $\frac{3}{4}$ "	Shadowline, $\frac{1}{8}$ " routing	Natural Fissured II	56854	.55-.65	35-39	5666	.55-.65	40-44
	III	Fineline, $\frac{3}{16}$ " routing	56954	.55-.65	35-39	5667	.55-.65	40-44
2' x 2' x $\frac{3}{4}$ "	Shadowline, $\frac{1}{8}$ " routing	Natural Fissured II	56855	.50-.60	40-44	5668	.50-.60	35-39
	IV	Fineline, $\frac{3}{16}$ " routing	56955	.50-.60	40-44	5669	.50-.60	35-39

PRISMS

Panels								
2' x 2' x $\frac{3}{4}$ "	Prisms	Omni Fissured	3991	.50-.60	40-44	N/A	—	—

(1) For edge drawings, see page 40.

(2) FIRECODE DESIGNER SQUARES panels measure 2' x 2' x $\frac{3}{4}$ ".

DESIGNER SQUARES

PRISMS

DESIGNER SQUARES I

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist

DESIGNER SQUARES II

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist

DESIGNER SQUARES III

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist

DESIGNER SQUARES IV

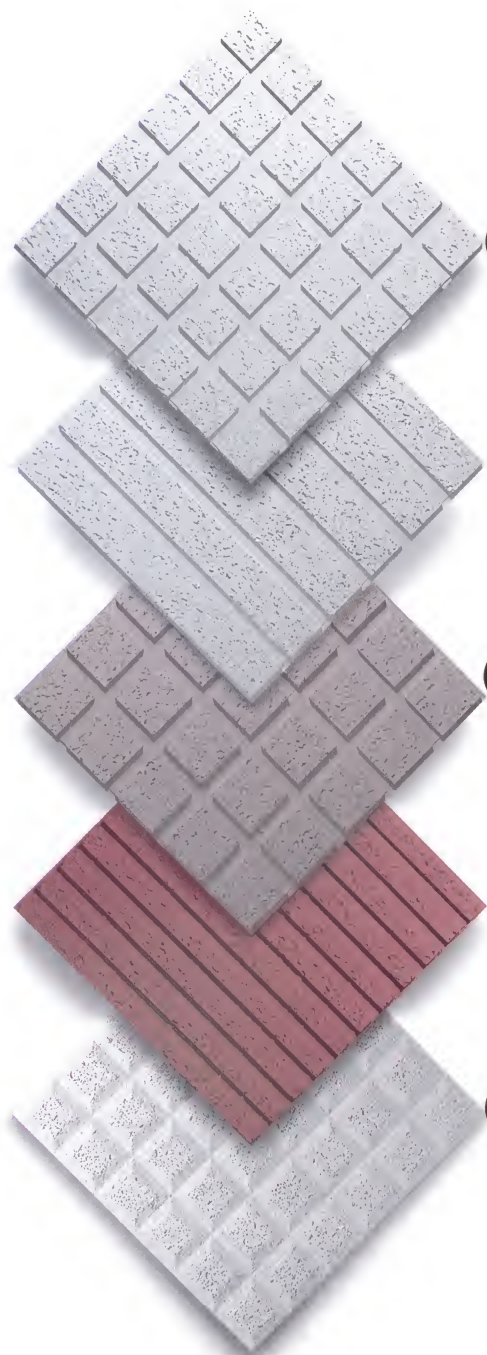
Colors—White, Manila, Silvertone, Parchment, Taupe, Mist

PRISMS

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist

Recommended Suspensions

- Shadowline Edge $\frac{1}{8}$ " Routing
 - DX, DXL
- Fineline Edge $\frac{3}{16}$ " Routing
 - CENTRICITEE
 - MERIDIAN



DESIGNER SQUARES II panels, Natural Fissured II pattern/CENTRICITEE suspension



ILLUSION Ceiling Series panels blend low-gloss, exposed suspension grids into the overall ceiling plane. Available in two surface patterns: Omni Fissured and Aspen. Standard routings: $\frac{1}{16}$ " and $\frac{15}{16}$ " for compatibility with narrow and standard grid widths.

- Two/24: square-module 2' x 2' panel look with 2' x 4' economy
- Four/48: 48" x 6" linear strips
- Eight/12: 12" x 12" tile look
- Thirty-two/6: the look of 6" x 6" tile
- Three/20: smaller 20" x 20" square-module panel look

Size	Edge ¹	Pattern	Regular			FIRECODE		
			Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

TWO/24

Panels

2' x 4' x $\frac{3}{8}$ "	SLT $\frac{1}{16}$ " routing	Omni Fissured	3575	.55-.65	40-44	3472	.55-.65	40-44
2' x 4' x $\frac{3}{8}$ "	ILT $\frac{1}{16}$ " routing	Omni Fissured	3576	.55-.65	40-44	3084	.55-.65	40-44
2' x 4' x $\frac{3}{8}$ "	SLT $\frac{1}{16}$ " routing	Aspen	652	.55-.65	40-44	3378	.55-.65	40-44
2' x 4' x $\frac{3}{8}$ "	ILT $\frac{1}{16}$ " routing	Aspen	6529	.55-.65	40-44	3205	.55-.65	40-44

FOUR/48

Panels

2' x 4' x $\frac{3}{8}$ "	SLT $\frac{1}{16}$ " routing	Omni Fissured	3565	.55-.65	40-44	3465	.55-.65	40-44
2' x 4' x $\frac{3}{8}$ "	ILT $\frac{1}{16}$ " routing	Omni Fissured	3567	.55-.65	40-44	3085	.55-.65	40-44
2' x 4' x $\frac{3}{8}$ "	SLT $\frac{1}{16}$ " routing	Aspen	653	.55-.65	40-44	3379	.55-.65	40-44
2' x 4' x $\frac{3}{8}$ "	ILT $\frac{1}{16}$ " routing	Aspen	6539	.55-.65	40-44	3206	.55-.65	40-44

TWO/24

FOUR/48

EIGHT/12

THIRTY-TWO/6

THREE/20

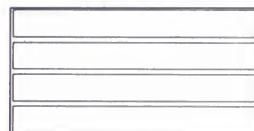
Two/24

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist ²



Four/48

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist ²



Eight/12

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist ²



Thirty-two/6

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist ²



Three/20

Colors—White, Manila, Silvertone, Parchment, Taupe, Mist ²



Size	Edge¹	Pattern	Regular			FIRECODE		
			Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

EIGHT/12

Panels

2' x 4' x 3/4"	SLT 1/8" routing	Omni Fissured	3570	.55-.65	40-44	3470	.50-.60	40-44
2' x 4' x 3/4"	ILT 3/8" routing	Omni Fissured	3571	.55-.65	40-44	3391	.55-.65	40-44
2' x 4' x 3/4"	SLT 1/8" routing	Aspen	654	.55-.65	40-44	3380	.55-.65	40-44
2' x 4' x 3/4"	ILT 3/8" routing	Aspen	6549	.55-.65	40-44	3207	.55-.65	40-44

THIRTY-TWO/6

Panels

2' x 4' x 3/4"	SLT 1/8" routing	Omni Fissured	3578	.50-.60	40-44	3473	.50-.60	40-44
2' x 4' x 3/4"	ILT 3/8" routing	Omni Fissured	3577	.50-.60	40-44	3471	.55-.65	40-44
2' x 4' x 3/4"	SLT 1/8" routing	Aspen	656	.55-.65	40-44	3381	.55-.65	40-44
2' x 4' x 3/4"	ILT 3/8" routing	Aspen	6569	.55-.65	40-44	3208	.55-.65	40-44

THREE/20

Panels

20" x 60" x 3/4"	SLT 1/8" routing	Omni Fissured	3580	.50-.60	40-44	3046	.55-.65	40-44
20" x 60" x 3/4"	ILT 3/8" routing	Omni Fissured	3581	.50-.60	40-44	3048	.55-.65	40-44
20" x 60" x 3/4"	SLT 1/8" routing	Aspen	655	.55-.65	40-44	3382	.55-.65	40-44
20" x 60" x 3/4"	ILT 3/8" routing	Aspen	6559	.55-.65	40-44	3209	.55-.65	40-44

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

Sections of Thirty-two/6

panels with available
surface patterns:

Omni Fissured

Aspen

Recommended Suspensions

Shadowline Tapered (SLT) Edge

1/8" Routing

• DX, DXL

Interline Tapered (ILT) Edge

3/8" Routing

• CENTRICITEE

• MERIDIAN



Surf and two new tailored patterns, to integrate beautifully with floor coverings, furniture fabrics, and window treatments. Ideal for tasteful, functional ceilings.

- **Allegro:** symmetrical, woven texture on a generous scale
- **Calypso:** soft, nonrepeating rivulets of texture with minute perforations
- **Surf:** shading and three-dimensional fissures

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ALLEGRO

Panels

2' x 2' x 1/2"	Square	4501	.55-.65	35-39	4551	.60-.70	35-39
2' x 4' x 1/2"	Square	4500	.55-.65	35-39	4550	.60-.70	35-39
2' x 2' x 1/2"	SLT	4505	.50-.60	35-39	4555	.55-.65	35-39
2' x 4' x 1/2"	SLT	4506	.50-.60	35-39	4556	.55-.65	35-39
2' x 2' x 1/2"	ILT	4507	.50-.60	35-39	4557	.55-.65	35-39
2' x 2' x 1/2"	Fineline	4509	.50-.60	35-39	4559	.55-.65	35-39

Tile

12" x 12" x 1/2"	Bevel Edge/Kerf	4511	.50-.60	40-44	4561	.55-.65	40-44
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CALYPSO

Panels

2' x 2' x 1/2"	Square	4601	.55-.65	35-39	4651	.60-.70	35-39
2' x 4' x 1/2"	Square	4600	.55-.65	35-39	4650	.60-.70	35-39
2' x 2' x 1/2"	SLT	4605	.50-.60	35-39	4655	.55-.65	35-39
2' x 4' x 1/2"	SLT	4606	.50-.60	35-39	4656	.55-.65	35-39
2' x 2' x 1/2"	ILT	4607	.50-.60	35-39	4657	.55-.65	35-39
2' x 2' x 1/2"	Fineline	4609	.50-.60	35-39	4659	.55-.65	35-39

Tile

12" x 12" x 1/2"	Bevel Edge/Kerf	4611	.50-.60	40-44	4661	.55-.65	40-44
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SURF

White on Gray Panels

2' x 2' x 1/2"	Square	664	.55-.65	35-39	668	.60-.70	35-39
2' x 4' x 1/2"	Square	665	.55-.65	35-39	669	.60-.70	35-39
2' x 2' x 1/2"	SLT	661	.50-.60	35-39	667	.55-.65	35-39
2' x 4' x 1/2"	SLT	5792	.50-.60	35-39	N/A	—	—

White on Gray Tile

12" x 12" x 1/2"	Bevel Edge/Kerf	660	.50-.60	40-44	666	.55-.65	40-44
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Designer White Panels

2' x 2' x 1/2"	Square	5793	.55-.65	35-39	5812	.60-.70	35-39
2' x 4' x 1/2"	Square	5794	.55-.65	35-39	5811	.60-.70	35-39
2' x 2' x 1/2"	SLT	5796	.50-.60	35-39	5813	.55-.65	35-39
2' x 4' x 1/2"	SLT	5795	.55-.65	35-39	N/A	—	—

Designer White on Beige Panels

2' x 2' x 1/2"	SLT	5799	.50-.60	35-39	N/A	—	—
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(1) For edge drawings, see page 40.

ALLEGRO

CALYPSO

SURF

Allegro

Colors—White plus 24 colors

Calypso

Colors—White plus 24 colors

Surf

Colors—White on Gray, Designer White, Designer White on Beige

Recommended Suspensions

Square Edge

- DX, DXL
- CENTRICITEE
- MERIDIAN

Shadowline Tapered (SLT) Edge

- DX, DXL

Interline Tapered (ILT) Edge

- CENTRICITEE
- MERIDIAN

Fineline Edge

- FINELINE
- Fineline 1/8
- Highline

Bevel Edge Standard Kerf Tile

- DX Concealed



Natural texture look patterns, with the cost/performance advantages of water-felted products. Designed to create a prominent ceiling plane with a richly textured surface.

- Aspen: random, naturally sculptured appearance
- Aurora: bold, eroded texture

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ASPEN

Panels

2' x 2' x 3/4"	SLT	650	.55-.65	35-39	3845	.60-.70	35-39
2' x 4' x 3/4"	SLT	651	.55-.65	35-39	3850	.60-.70	35-39
2' x 2' x 3/4"	ILT	644	.55-.65	35-39	643	.60-.70	35-39
2' x 2' x 3/4"	Fineline	649	.55-.65	35-39	N/A	—	—
2' x 4' x 3/4"	Fineline	648	.55-.65	35-39	N/A	—	—

AURORA

Panels

2' x 2' x 3/4"	SLT	55620	.45-.55	40-44	50620	.45-.55	40-44
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Tile

12" x 12" x 3/4"	Square Edge/Kerf	55441	.55-.65	40-44	50441	.55-.65	40-44
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(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

ASPEN

AURORA

Aspen

Colors—White plus 24 colors ²

Aurora

Color—White

Recommended Suspensions

Square Edge

- DX

Shadowline Tapered (SLT) Edge

- DX, DXL

Interline Tapered (ILT) Edge

- CENTRICITEE

- MERIDIAN

Fineline Edge

- FINELINE

- Fineline 1/8

- Highline

Square Edge Standard Kerf Tile

- DX Concealed



Excellent NRC's combined with optimum density, plus excellent STC's for privacy in closed-plan.

All patterns also available in standard AURATONE ceilings for use in adjacent areas.

- High-NRC Omni Fissured: lightly fissured, heavily perforated
- PREMIER Natural Fissured II: deeply fissured, moderately perforated
- High-NRC and PREMIER Fine Fissured: finest fissures and perforations

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

HIGH-NRC ONNI FISSURED

Panels

2' x 2' x 3/4"	Square	3173	.65-.75	35-39	N/A	—	—
2' x 4' x 3/4"	Square	3178	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	SLT	3148	.65-.75	35-39	N/A	—	—

PREMIER NATURAL FISSURED II

Panels

2' x 2' x 3/4"	SLT	N/A	—	—	50832	.70-.80	35-39
2' x 4' x 3/4"	Square	N/A	—	—	56836	.80-.90	35-39
20" x 60" x 3/4"	Square	N/A	—	—	56835	.75-.85	35-39
2' x 2' x 3/4"	Fineline	N/A	—	—	3396	.70-.80	35-39

HIGH-NRC FINE FISSURED

Panels

2' x 2' x 3/4"	Square	3661	.65-.75	35-39	N/A	—	—
2' x 4' x 3/4"	Square	3660	.65-.75	35-39	N/A	—	—
2' x 2' x 3/4"	SLT	3662	.65-.75	35-39	N/A	—	—

PREMIER FINE FISSURED

Panels

2' x 2' x 3/4"	Square	N/A	—	—	3641	.75-.85	35-39
2' x 4' x 3/4"	Square	N/A	—	—	3640	.75-.85	35-39
2' x 5' x 3/4"	Square	N/A	—	—	3646	.75-.85	35-39
20" x 60" x 3/4"	Square	N/A	—	—	3644	.75-.85	35-39
2' x 2' x 3/4"	SLT	N/A	—	—	3642	.70-.80	35-39
2' x 4' x 3/4"	SLT	N/A	—	—	3643	.70-.80	35-39
2' x 2' x 3/4"	ILT	N/A	—	—	3647	.70-.80	35-39
2' x 2' x 3/4"	Fineline	N/A	—	—	3397	.70-.80	35-39

(1) For edge drawings, see page 40.

(2) See sales representative for availability of specific colors.

HIGH-NRC ONNI FISSURED

PREMIER NATURAL FISSURED II

HIGH-NRC FINE FISSURED

PREMIER FINE FISSURED

High-NRC Omni Fissured

Colors—White plus 24 colors²

PREMIER Natural Fissured II

Color—White

High-NRC Fine Fissured

Colors—White plus 24 colors²

PREMIER Fine Fissured

Colors—White plus 24 colors²

Recommended Suspensions

- Square Edge
 - DX, DXL
 - CENTRICITEE
 - MERIDIAN
- Shadowline Tapered (SLT) Edge
 - DX, DXL
- Interline Tapered (ILT) Edge
 - CENTRICITEE
 - MERIDIAN
- Fineline Edge
 - FINELINE
 - Fineline 1/8
 - Highline

Random fissured patterns that come in a wide selection of size and edge combinations. Designed for use where a well-defined ceiling plane with a distressed surface is desired.

- **Omni Fissured:** lightly fissured, heavily perforated
- **Natural Fissured II:** deeply fissured, moderately perforated

Size	Edge ¹	Regular	NRC Range	STC Range	FIRECODE	NRC Range	STC Range
		Item No.			Item No.		

OMNI FISSURED

Panels

2' x 2' x 3/8"	Square	344	.50-.60	35-39	338	.50-.60	40-44
2' x 4' x 3/8"	Square	345	.50-.60	35-39	339	.50-.60	40-44
2' x 4' x 3/8"	Square	343	.60-.70	40-44	3742	.55-.65	40-44
2' x 2' x 3/8"	SLT	323	.50-.60	35-39	336	.50-.60	35-39
2' x 2' x 3/8"	SLT	341	.55-.65	35-39	3385	.50-.60	35-39
2' x 4' x 3/8"	SLT	330	.50-.60	35-39	337	.50-.60	35-39
2' x 4' x 3/8"	SLT	332	.55-.65	35-39	3334	.50-.60	35-39
2' x 2' x 3/8"	ILT	5530	.50-.60	35-39	3386	.55-.65	35-39
2' x 2' x 3/8"	Fineline	5551	.50-.60	35-39	5751	.50-.60	35-39
2' x 2' x 3/8"	Fineline	3025	.55-.65	35-39	3392	.50-.60	35-39

Tile

12" x 12" x 3/8"	Bevel Edge/Kerf	320	.50-.60	40-44	335	.55-.65	40-44
12" x 12" x 3/8"	Bevel Edge/Kerf	340	.55-.65	45-49	N/A	—	—

NATURAL FISSURED II

Panels

2' x 2' x 3/8"	Square	56704	.50-.60	35-39	56766	.50-.60	35-39
2' x 4' x 3/8"	Square	56705	.55-.65	35-39	56765	.50-.60	40-44
2' x 2' x 3/8"	SLT	52704	.50-.60	35-39	50704	.50-.60	35-39
2' x 2' x 3/8"	SLT	50230	.55-.65	35-39	50052	.55-.65	35-39
2' x 4' x 3/8"	SLT	52705	.50-.60	35-39	50705	.55-.65	35-39
2' x 2' x 3/8"	ILT	52707	.50-.60	35-39	3384	.55-.65	35-39
2' x 2' x 3/8"	ILT	55702	.50-.60	35-39	55707	.55-.65	35-39

Tile

12" x 12" x 3/8"	Bevel Edge/Kerf	50120	.55-.65	35-39	N/A	—	—
12" x 12" x 3/8"	Bevel Edge/Kerf	50210	.60-.70	35-39	N/A	—	—
12" x 12" x 3/8"	Tongue & Groove Flange	50092	.55-.65	35-39	N/A	—	—

(1) For edge drawings, see page 40.

(2) Tile available in white; also see sales representative for availability of specific colors.

OMNI FISSURED

NATURAL FISSURED II

Omni Fissured

Colors—White plus 24 colors²

Natural Fissured II

Color—White

Recommended Suspensions

Square Edge

• DX, DXL

• CENTRICITEE

• MERIDIAN

Shadowline Tapered (SLT) Edge

• DX, DXL

Interline Tapered (ILT) Edge

• CENTRICITEE

• MERIDIAN

Fineline Edge

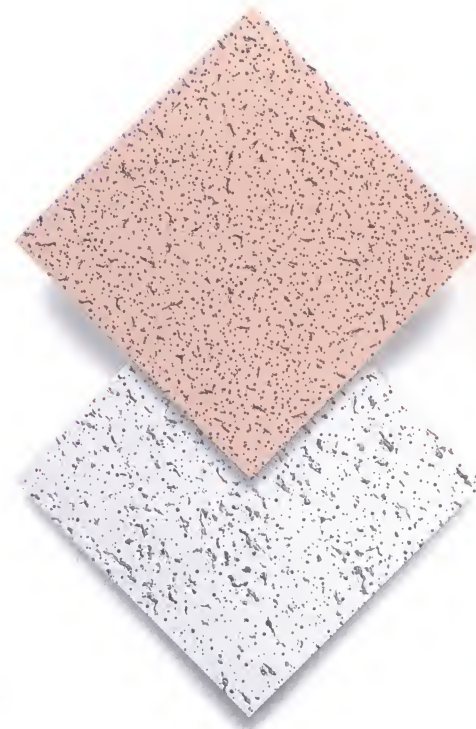
• FINELINE

• Fineline 1/8

• Highline

Bevel Edge Standard Kerf Tile

• DX Concealed



Two exceptionally light fissured patterns, designed to blend with any decorating style.

- Fine Fissured: finest fissures and perforations
- Corona: clean, crisp nondirectional fissures

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

FINE FISSURED

Panels

2' x 2' x 3/8"	Square	3621	.50-.60	40-44	3631	.55-.65	40-44
2' x 4' x 3/8"	Square	3620	.50-.60	40-44	3630	.55-.65	40-44
2' x 5' x 3/8"	Square	3627	.55-.65	35-39	3637	.55-.65	35-39
2' x 2' x 3/8"	SLT	3622	.55-.65	35-39	3632	.55-.65	35-39
2' x 4' x 3/8"	SLT	3623	.55-.65	35-39	3633	.55-.65	35-39
2' x 2' x 3/8"	ILT	3628	.55-.65	35-39	3638	.55-.65	35-39
2' x 2' x 3/8"	Fineline	3354	.55-.65	35-39	3394	.55-.65	35-39

Tile

12" x 12" x 3/8"	Bevel Edge/Kerf	3626	.50-.60	40-44	3636	.50-.60	40-44
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CORONA

Panels

2' x 2' x 3/8"	Square	392	.50-.60	35-39	397	.55-.65	40-44
2' x 4' x 3/8"	Square	391	.50-.60	35-39	398	.55-.65	40-44
2' x 2' x 3/8"	SLT	352	.55-.65	35-39	355	.50-.60	35-39
2' x 4' x 3/8"	SLT	351	.55-.65	35-39	356	.50-.60	35-39
2' x 2' x 3/8"	ILT	353	.50-.60	35-39	373	.55-.65	35-39
2' x 4' x 3/8"	ILT	354	.50-.60	35-39	374	.55-.65	35-39
2' x 2' x 3/8"	Fineline	5552	.55-.65	35-39	5752	.55-.65	35-39
2' x 4' x 3/8"	Fineline	5553	.55-.65	35-39	5753	.55-.65	35-39

Tile

12" x 12" x 3/8"	Bevel Edge/Kerf	720	.50-.60	40-44	N/A	—	—
12" x 12" x 3/8"	Bevel Edge/Kerf	730	—	—	930	—	—

- (1) For edge drawings, see page 40.
(2) See sales representative for availability of specific colors.

Recommended Suspensions

- Square Edge
- DX, DXL
 - CENTRICITEE
 - MERIDIAN
- Shadowline Tapered (SLT) Edge
- DX, DXL
- Interline Tapered (ILT) Edge
- CENTRICITEE
 - MERIDIAN
- Fineline Edge
- FINELINE
 - Fineline 1/8
 - Highline
- Bevel Edge Standard Kerf Tile
- DX Concealed

FINE FISSURED

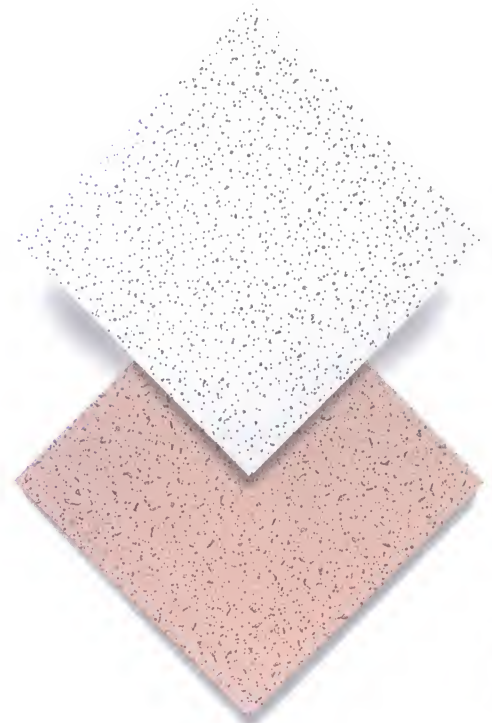
CORONA

Fine Fissured

Colors—White plus 24 colors ²

Corona

Colors—White plus 24 colors ²



Fine Fissured panels/CENTRICITEE suspension



Directional fissured panels and tile that provide balanced sound control. Designed for use where a subtle pattern of fissuring is desired.

- Fissured: directional fissures combined with random perforations

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

FISSURED

Panels

2' x 2' x 3/4"	Square	560	.50-.60	35-39	585	.50-.60	35-39
2' x 2' x 3/4"	Square	359	.60-.70	35-39	387	.60-.70	35-39
2' x 4' x 3/4"	Square	562	.50-.60	35-39	586	.55-.65	40-44
2' x 4' x 3/4"	Square	361	.60-.70	35-39	388	.60-.70	35-39
2' x 2' x 3/4"	SLT	506	.50-.60	35-39	517	.50-.60	35-39
2' x 2' x 3/4"	SLT	312	.55-.65	35-39	386	.50-.60	35-39
2' x 4' x 3/4"	SLT	507	.60-.70	35-39	518	.60-.70	35-39
2' x 4' x 3/4"	SLT	313	.60-.70	35-39	385	.60-.70	35-39
2' x 2' x 3/4"	ILT	50172	.50-.60	35-39	3388	.60-.70	35-39

Tile

12" x 12" x 3/4"	Staple Flange	500	.40-.50	N/A	N/A	—	—
12" x 12" x 3/4"	Bevel Edge/Kerf	504	.50-.60	40-44	515	.55-.65	45-49
12" x 12" x 3/4"	Bevel Edge/Kerf	304	.60-.70	40-44	317	.50-.60	45-49

(1) For edge drawings, see page 40.

FISSURED

Fissured

Color—White

Recommended Suspensions

Square Edge

- DX, DXL

- CENTRICITEE

- MERIDIAN

Shadowline Tapered (SLT) Edge

- DX, DXL

Interline Tapered (ILT) Edge

- CENTRICITEE

- MERIDIAN

Bevel Edge Standard Kerf Tile

- DX Concealed



Perforated patterns that combine versatile appearance with superb sound control. Used for understated, efficient acoustical ceilings.

- Pin-Perforated II Panels: random fine and coarse perforations
- Pin-Perforated Tile: random perforations
- Pebbled Panels and Tile: granular, perforated surface with improved sound ratings

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

PIN-PERFORATED II

Panels

2' x 2' x ½"	Square	462	.50-.60	35-39	472	.50-.60	35-39
2' x 4' x ½"	Square	464	.50-.60	35-39	474	.50-.60	35-39

PIN-PERFORATED

Tile

12" x 12" x ½"	Bevel Edge/Kerf	501	.50-.60	45-49	514	.50-.60	40-44
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PEBBLED

Panels

2' x 2' x ½"	Square	4801	.50-.60	35-39	4851	.50-.60	40-44
2' x 4' x ½"	Square	4800	.50-.60	35-39	4850	.50-.60	40-44
2' x 2' x ½"	SLT	4805	.50-.60	35-39	N/A	—	—
2' x 4' x ½"	SLT	4806	.50-.60	35-39	N/A	—	—

Tile

12" x 12" x ½"	BESK	4811	.55-.65	40-44	N/A	—	—
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(1) For edge drawings, see page 40.

PIN-PERFORATED II

PIN-PERFORATED

PEBBLED

Pin Perforated II

Color—White

Pin Perforated

Color—White

Pebbled

Color—White

Recommended Suspensions

Square Edge

- DX, DXL
- CENTRICITEE
- MERIDIAN

Shadowline Tapered (SLT) Edge

- DX

Bevel Edge Standard Kerf Tile

- DX Concealed



AURATONE SPECIAL FUNCTION PANELS AND TILE

Extra performance to meet strict environmental requirements. ROCK FACE® and IMPACTION® System panels and retention clips withstand direct contact. PREMIER glass fiber ceilings offer great sound absorption. Gypsum Lay-In and CLEAN ROOM panels resist fiber infiltration in food-processing areas and clean rooms. METAL FACE, SUPER-E, and CERAMIC HERITAGE panels are designed for hot, humid environments.

Surface burning characteristics (flame spread/smoke developed) are 15/10 for ROCK FACE, 15/0 for Gypsum Lay-In panels, 25/45 for CLEAN ROOM and METAL FACE, 0/0 for CERAMIC HERITAGE, and 25/10 for all other nonglass special function panels. Thermal resistance R-factors for nonglass panels (at 75°F mean temperature) are 1.85 for all $\frac{5}{8}$ " thick panels and 2.18 for all $\frac{3}{4}$ " thick panels.



Ceiling panels of specially compounded surface, texture and formulation provide high resistance to humidity, blows and scuffs. Gardner impact-tested to 20-25"-lb without visible damage. Ball-hardness tested (ASTM C367) to 150 lb.¹

- **ROCK FACE** panels: hard core, granular textured surface. Supports insulation weight up to .75 lb/ft.²
- **IMPACTION** System: look-alike panel plus flexible retention clips, totally compatible with **ROCK FACE** panels in mixed use. Resistant to breaking, cracking or falling out.

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

ROCK FACE PANELS

Panels

2' x 2' x 3/4"	Square	N/A	—	—	56335	.40-.50	35-39
2' x 2' x 3/4"	SLT	N/A	—	—	55483	.50-.60	35-39
2' x 4' x 3/4"	Square	N/A	—	—	56380	.55-.65	35-39

Tile

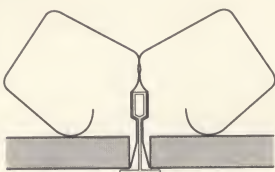
12" x 12" x 3/4"	Bevel Edge/Kerf	N/A	—	—	55385	.65-.75	40-44
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IMPACTION SYSTEM

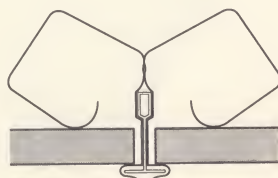
Panels

2' x 2' x 3/4"	Square	N/A	—	—	56901	.60-.70	35-39
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- (1) Ball-hardness tested to 150 lb. for 1/4" depression by a 2" steel ball (2 retention clips attached to suspension grid for each panel).
- (2) For edge drawings, see page 40.
- (3) Suspension systems should suit high-humidity or corrosive environmental conditions if they exist. See Ceiling Suspension Systems, page 38.



Rock Face Panel Retention Clip (Item #20428)



Impaction Spring Assembly Clip (Item #20429, U.S. Patent No. 3,834,106)

Retention and Impaction Clips require 1 1/2" high grid members.

ROCK FACE PANELS

IMPACTION SYSTEM

ROCK FACE

Color—White

IMPACTION

Color—White

Recommended Suspensions³

Square and Shadowline Tapered (SLT) Edge

- DX, DXL
- ZXA, ZXLA
- Bevel Edge Standard Kerf Tile
- DX Concealed



Cloth and vinyl faced glass fiber panels, for superb noise reduction.

- Nubby: fiberglass cloth pattern with a brushed canvas look
- HI-LITE: washable vinyl film in two patterns, Twill and Kapok

Size	Edge ¹	Regular			Foil Backing		
		Item No.	NRC Range	STC Range ³	Item No.	NRC Range	STC Range

PREMIER NUBBY

Panels

2' x 2' x 3/4"	Square	7000 G	.80-.90	N/A	7010 G	.85-.95	20-24
2' x 2' x 1"	Square	7002 G	.85-.95	N/A	7012 G	.90-1.00	20-24
2' x 2' x 1 1/2"	Square	7006 G	.95-1.05	N/A	7015 G	.95-1.05	30-34
2' x 4' x 3/4"	Square	7001 G	.80-.90	N/A	7011 G	.85-.95	20-24
2' x 4' x 1"	Square	7003 G	.85-.95	N/A	7013 G	.90-1.00	20-24
2' x 4' x 1 1/2"	Square	7007 G	.95-1.05	N/A	7016 G	.95-1.05	30-34
4' x 4' x 1"	Square	7004 G	.85-.95	N/A	7014 G	.90-1.00	20-24
4' x 8' x 1"	Square	7005 G	.85-.95	N/A	N/A	—	—
30" x 30" x 1"	Square	7020 G	.85-.95	N/A	N/A	—	—
2' x 2' x 1 1/2"	Shadowline ²	7026 G	.95-1.05	N/A	7030 G	.95-1.05	30-34
2' x 2' x 1 1/2"	Fineline ²	7027 G	.95-1.05	N/A	N/A	—	—

Size	Edge ¹	Regular			Unperforated		
		Item No.	NRC Range	STC Range ³	Item No.	NRC Range	STC Range

PREMIER HI-LITE

Twill Panels

2' x 2' x 3/4"	Square	7050 G	.65-.75	N/A	7052 G	.50-.60	N/A
2' x 4' x 3/4"	Square	7051 G	.65-.75	N/A	7053 G	.50-.60	N/A
2' x 2' x 1"	Square	7060 G	.80-.90	N/A	N/A	—	—
2' x 4' x 1"	Square	7061 G	.80-.90	N/A	N/A	—	—
4' x 4' x 1"	Square	7062 G	.80-.90	N/A	N/A	—	—

Kapok Panels

2' x 2' x 3/4"	Square	7054 G	.65-.75	N/A	7056 G	.50-.60	N/A
2' x 4' x 3/4"	Square	7055 G	.65-.75	N/A	7057 G	.50-.60	N/A

- (1) For edge drawings, see page 40.
 (2) Painted edges.
 (3) Panels without backing attain an STC range of 15-19.

Recommended Suspensions

- Square Edge
- DX
 - CENTRICITEE
 - MERIDIAN
- Shadowline Edge
- DX
- Fineline Edge
- CENTRICITEE
 - MERIDIAN
 - FINELINE
 - Fineline 1/8
 - Highline

NUBBY

HI-LITE

Nubby

Color—White

Twill

Color—White

Kapok

Color—White



Nubby panels/DX suspension



Tough, washable, inexpensive ceilings for interior and exterior applications. USDA acceptance for food processing areas. Gypsum Lay-In panels have tough gypsum panel core, fire resistance at no extra cost.

- White vinyl facing: stipple pattern, 2-mil-thick vinyl is easily washable, offers grade LR 1 light reflectance
- Unfinished paper facing: natural color paper facing, for economical utility applications

Size	Edge ¹	Regular			FIRECODE		
		Item No.	NRC Range	STC Range	Item No.	NRC Range	STC Range

STIPPLE PATTERN

Panels							
2' x 2' x 1/2"	Square	N/A	—	—	3260	N/A	45-49
2' x 4' x 1/2"	Square	N/A	—	—	3270	N/A	45-49

NATURAL COLOR PAPER

Panels							
2' x 2' x 1/2"	Square	N/A	—	—	3440	N/A	45-49
2' x 4' x 1/2"	Square	N/A	—	—	3450	N/A	45-49

(1) For edge drawings, see page 40.

GYPSUM LAY-IN

Stipple Pattern

Color—White

Natural Color Paper

Unfinished Paper

Recommended Suspensions

- Square Edge
- DXL, DXLA
- ZXA, ZXLA
- CENTRICITEE
- MERIDIAN



Gypsum Lay-In panels, stipple pattern/DXLA suspension

Tough, fire-resistant panels for high-tech clean rooms. Sealed edges and special back coating control airborne particles to meet stringent requirements. Offers grade LR 1 light reflectance, meets Federal Standard 209D and high standards for hospitals, laboratories and computer rooms. Superior accessibility and washability, corrosion resistance and freeze/thaw-resistance.

- CLEAN ROOM Class 100: impervious surface of white-vinyl coated aluminum foil¹
- CLEAN ROOM Class 10M-100M: perforated, white-vinyl coated aluminum foil surface¹

Size	Edge ²	Regular	FIRECODE			NRC Range	STC Range
		Item No.	NRC Range	STC Range	Item No.		

CLEAN ROOM CLASS 100

Panels

2' x 4' x 3/8"	Square	N/A	—	—	56091	N/A	40-44
----------------	--------	-----	---	---	-------	-----	-------

CLEAN ROOM CLASS 10M-100M

Panels

2' x 4' x 3/8"	Square	N/A	—	—	56090	.55-.65	40-44
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- (1) Panel face is foil; edges are painted.
(2) For edge drawings, see page 40.

CLEAN ROOM CLASS 100

CLEAN ROOM CLASS 10M-100M

Class 100

Color—White

Class 10M-100M

Color—White

Recommended Suspensions

- Square Edge
- DX, DXL, DXLA
 - ZXA, ZXLA



Three special FIRECODE formulations that meet strict environmental requirements.

- **METAL FACE:** embossed aluminum surface, white-vinyl coated. Offers extra resistance to corrosion, soiling, humidity, chlorine vapors and sag. Gardner scrubbability-tested finish to 5,000 cycles.
- **SUPER-E:** foil face and back. Designed to withstand ambient temperatures/humidities up to 90° F/90% R.H.
- **CERAMIC HERITAGE:** 100% ceramic-bonded mineral fiber, formulated for strength and durability. Withstands high heat, humidity or corrosive chemical fumes: tested successfully in live-steam temperatures of up to 275°F.

Size	Edge ¹	Regular	FIRECODE			NRC Range	STC Range
		Item No.	NRC Range	STC Range	Item No.		

METAL FACE (PERFORATED)

Panels

2' x 2' x 1/8"	Square	N/A	—	—	56092	.50-.60	40-44
2' x 4' x 1/8"	Square	N/A	—	—	56096	.55-.65	40-44

METAL FACE (UNPERFORATED)

Panels

2' x 2' x 1/8"	Square	N/A	—	—	56093	N/A	40-44
2' x 4' x 1/8"	Square	N/A	—	—	56094	N/A	40-44

SUPER-E (MICRO-PERFORATED)

Panels

2' x 2' x 1/8"	Square	N/A	—	—	672	.50-.60	40-44
2' x 4' x 1/8"	Square	N/A	—	—	675	.50-.60	40-44

SUPER-E (UNPERFORATED)

Panels

2' x 4' x 1/8"	Square	N/A	—	—	5405	—	40-44
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CERAMIC HERITAGE

Panels

2' x 4' x 1/8"	Square	N/A	—	—	56645	.35-.45	40-44
2' x 2' x 1/8"	Square	N/A	—	—	56644	.35-.45	40-44

(1) For edge drawings, see page 40.

METAL FACE

SUPER-E

CERAMIC HERITAGE

METAL FACE (Perforated)

Color—White

METAL FACE (Unperforated)

Color—White

CERAMIC HERITAGE

Color—White

SUPER-E (Micro-Perforated)

Color—White

Recommended Suspensions

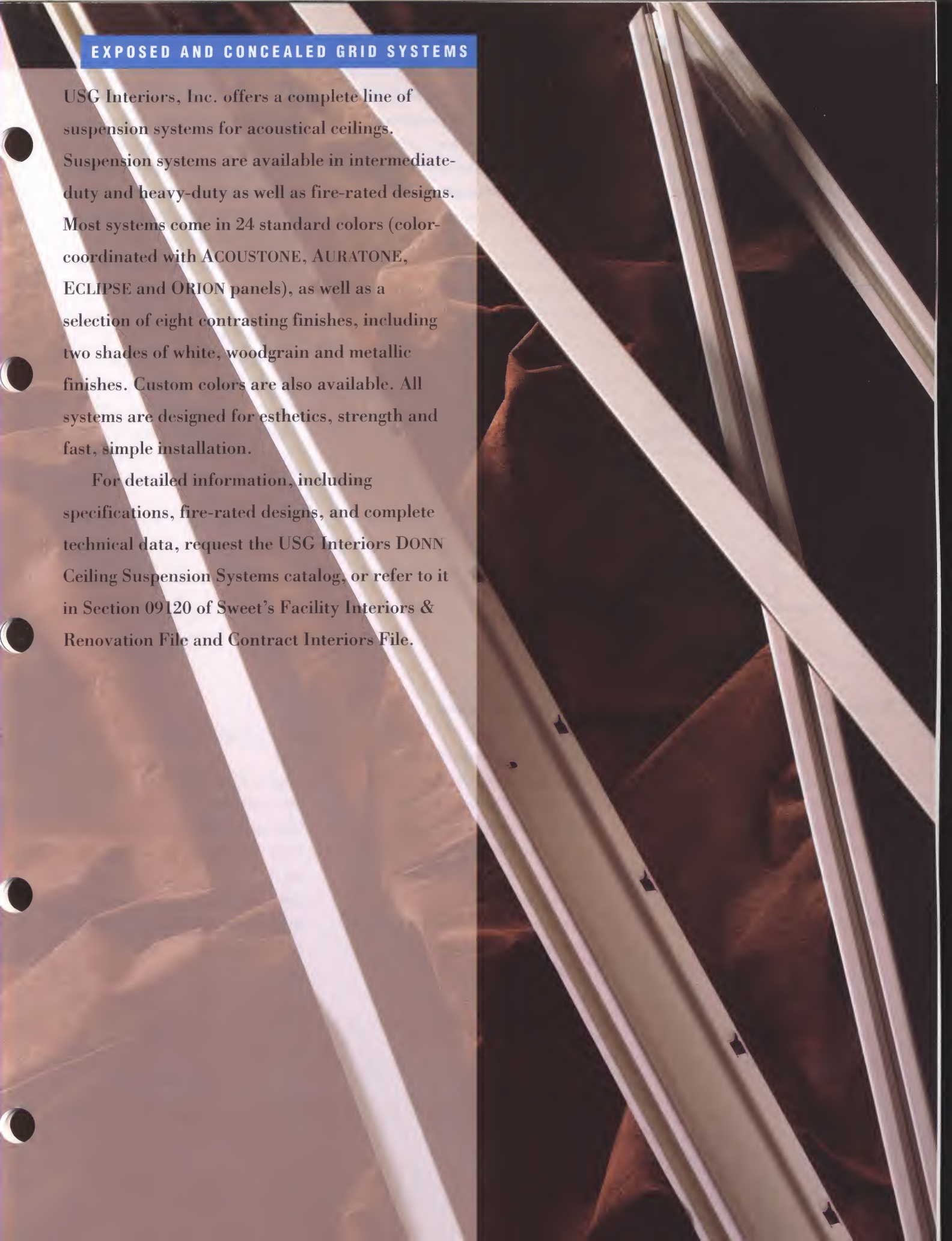
Square Edge

• ZXA, AX

EXPOSED AND CONCEALED GRID SYSTEMS

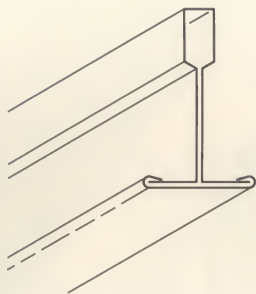
USG Interiors, Inc. offers a complete line of suspension systems for acoustical ceilings. Suspension systems are available in intermediate-duty and heavy-duty as well as fire-rated designs. Most systems come in 24 standard colors (color-coordinated with ACOUSTONE, AURATONE, ECLIPSE and ORION panels), as well as a selection of eight contrasting finishes, including two shades of white, woodgrain and metallic finishes. Custom colors are also available. All systems are designed for esthetics, strength and fast, simple installation.

For detailed information, including specifications, fire-rated designs, and complete technical data, request the USG Interiors DONN Ceiling Suspension Systems catalog, or refer to it in Section 09120 of Sweet's Facility Interiors & Renovation File and Contract Interiors File.



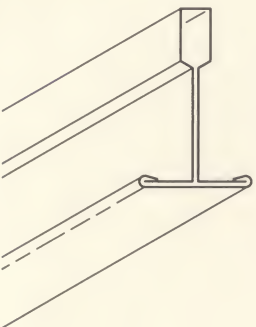
DX

- The most widely used acoustical suspension system
- Maximum economy, simplicity, and access in an exposed grid system
- Meets or exceeds all national code requirements, including seismic
- Intermediate- or heavy-duty main tee ratings
- Proven, corrosion-resistant coating
- Available in 32 standard finishes
- Accepts Square, Shadowline, Shadowline Tapered and Prisms edge panels, and Gypsum Lay-In panels
- **DXL**: Fire-rated systems with more than 60 designs to 3 hr.—with all the standard DX advantages
- **DXLA**: Fire-rated system of steel components with corrosion-resistant aluminum cap on exposed surfaces
- **DXW**: All the features of $\frac{1}{8}$ " DX grid with a $1\frac{1}{2}$ " exposed face



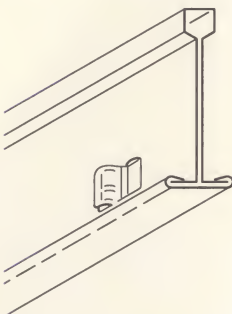
DX Concealed Grid

- Supporting grid can be completely concealed, providing a monolithic appearance
- Four systems available to accommodate a variety of access requirements
- Light fixtures, air diffusers, and plenum access can be arranged with great flexibility
- Fire-rated assemblies available
- Accepts Square Edge Standard Kerf and Bevel Edge Standard Kerf tile



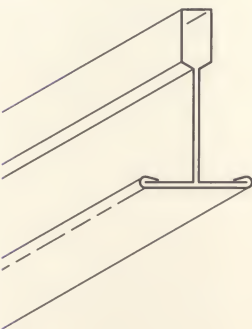
CENTRICITEE

- Subtle visual effect from a narrow line exposed grid system
- First 2-hour fire-rated $\frac{3}{8}$ " grid
- Patented, automatic panel-centering device
- Meets or exceeds all national code requirements, including seismic
- Available in 29 standard finishes
- Accepts Square, Fineline, and Interline Tapered edge panels, and Gypsum Lay-In panels



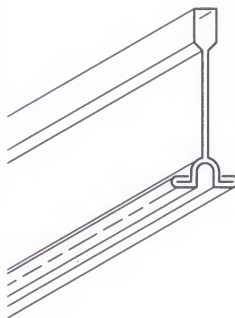
Environmental Grid Systems

- Ideal for high humidity areas
- **ZXA**: double webbed galvanized steel body with painted aluminum cap and stainless steel DX clips; strength exceeds comparable aluminum systems
- **ZXLA**: fire-rated, accepted in all DXLA designs
- **AX**: double-webbed all aluminum grid with stainless steel DX clips; cross tees with offset ends rest on main tees without sagging, twisting
- Accepts Square, Shadowline, Shadowline Tapered and Prisms edge panels, and Gypsum Lay-In panels



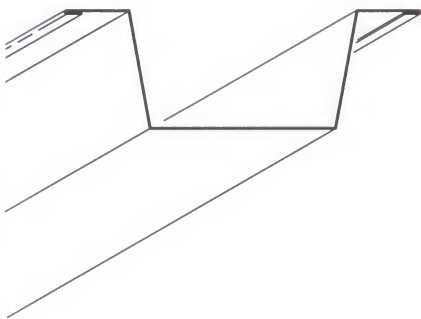
MERIDIAN

- Combines esthetics of more expensive screw-slot grids with the function and utility of exposed grid
- Unique, rounded $\frac{1}{2}$ " reveal softens effect of the grid lines and enhances finished installation
- Automatic centering of panels and light fixtures
- Available in 31 standard finishes
- Accepts Square, Fineline, and Interline Tapered edge panels, and Gypsum Lay-In panels



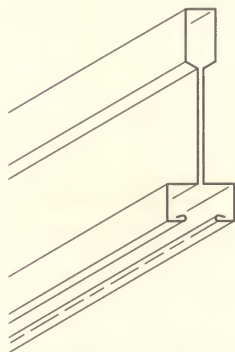
RIGID X

- Ideal for screw attaching SHEETROCK® brand gypsum panels
- Accepts standard lay-in light fixtures and air diffusers
- Many fire-rated designs
- Quickly installed with modular components
- Knurled face on furring channels and furring cross tees
- Combines the installation speed of grid and the durability of black iron furring channel systems into one unique system
- Heavy-duty construction



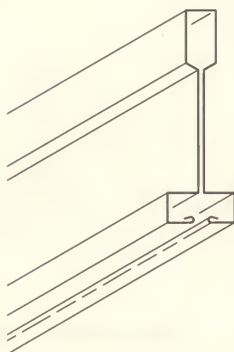
FINELINE

- Innovative, narrow profile, slotted ceiling grid
- Mitered corners offer a clean, crisp, finished appearance
- DONN brand air diffuser assemblies integrate with grid and panels for a clean, uninterrupted ceiling plane
- Cost savings from fast assembly, choice of module sizes and standard fixtures
- Available in 24 standard colors
- Available in all white and white with black reveal
- New FINELINE With Inside Color. Outside box of black or white with contrasting reveal of red, yellow, royal blue or turquoise. Effective use of bright color—perfect with black or white ceiling panels
- Intermediate- or heavy-duty main tee classification
- Fire-rated assemblies available
- Accepts Fineline edge panels



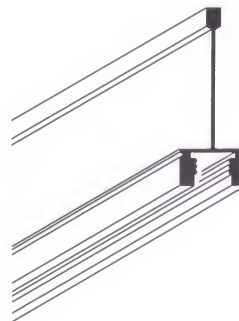
Fineline 1/8

- Suspension system with all the advantages of the regular FINELINE system
- $\frac{1}{8}$ " reveal, mitered corners for a clean, finished look
- Creates intriguing designs with patterns on the Geometrix panels
- Available in Flat White
- Accepts Fineline edge panels

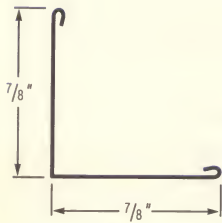


Highline

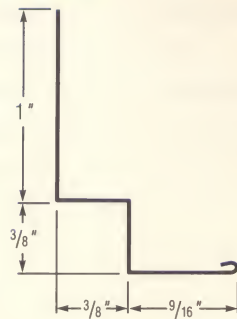
- Narrow-faced extruded aluminum screw-slot grid
- Smooth, medium, and heavy textures available, including the option of a contrasting black reveal
- Provides an uninterrupted reveal for a trim, finished appearance
- Accepts Fineline edge panels



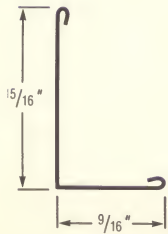
WALL ANGLES AND MOLDINGS



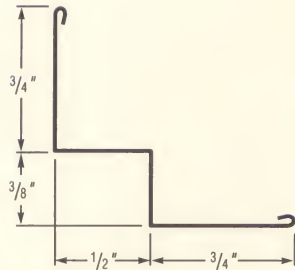
M7



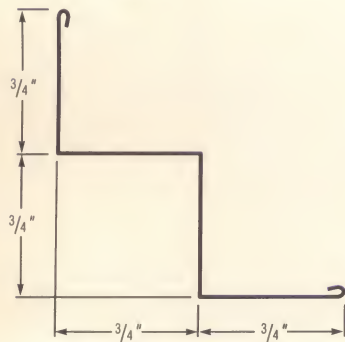
MS174



M9



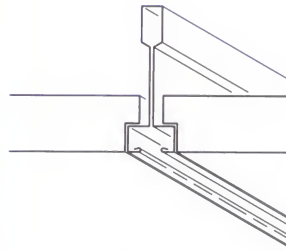
MS144



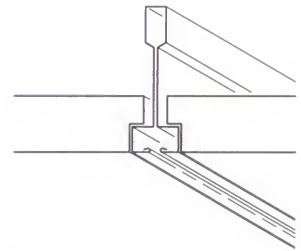
MS164

Other wall angles and moldings are available to meet specific requirements. Consult your USG Interiors representative for details.

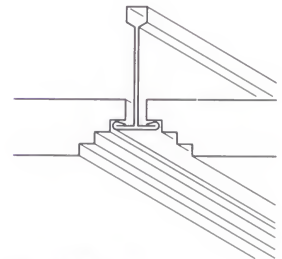
PANEL EDGES/SUSPENSION DETAILS



**Fineline (FL) Panel
Fineline Grid**

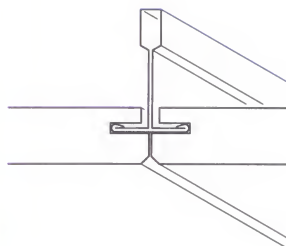


**Fineline (FL) Panel
Fineline 1/8 Grid**

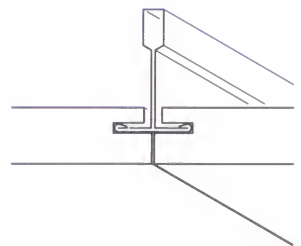


**Pedestals Panel
Centricitee Grid**

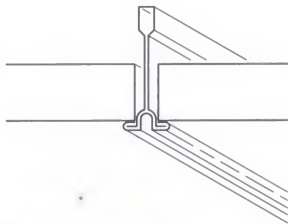
TILE EDGES/SUSPENSION DETAILS



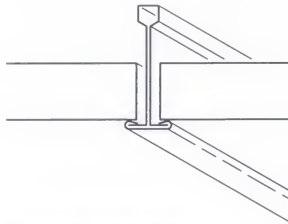
**Bevel Edge Standard Kerf (BESK) Tile
DX Concealed Grid**



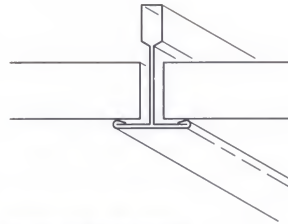
**Square Edge Standard Kerf (SESK) Tile
DX Concealed Grid**



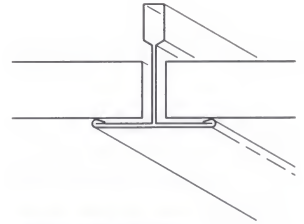
Square Edge (SQ) Panel
Meridian Grid



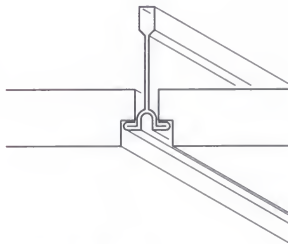
Square Edge (SQ) Panel
Centricitee Grid



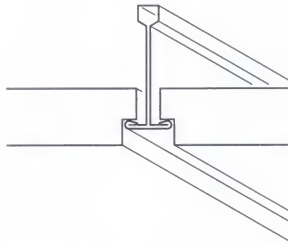
Square Edge (SQ) Panel
DX Grid



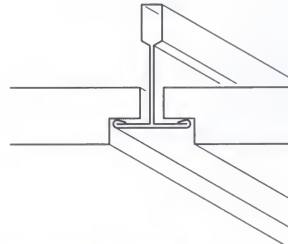
Square Edge (SQ) Panel
DXW Grid



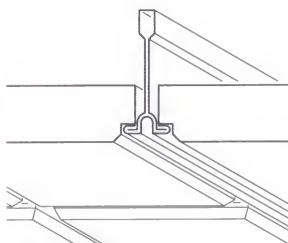
Finline (FL) Panel
Meridian Grid



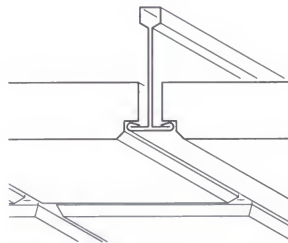
Finline (FL) Panel
Centricitee Grid



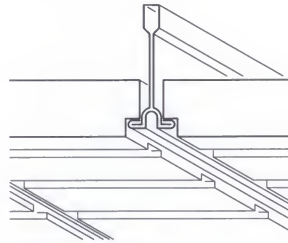
Shadowline (SL) Panel
DX Grid



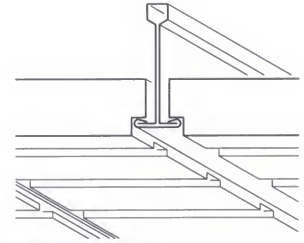
Chex/16 Panel
Meridian Grid



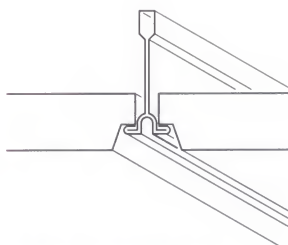
Chex/16 Panel
Centricitee Grid



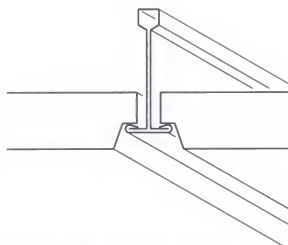
Checkmate Panel
Meridian Grid



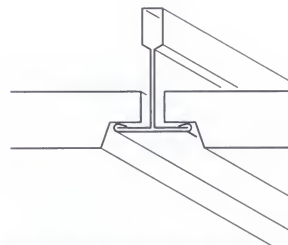
Checkmate Panel
Centricitee Grid



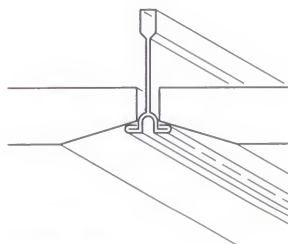
Interline Tapered (ILT) Panel
Meridian Grid



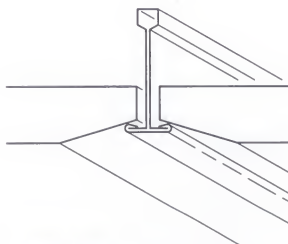
Interline Tapered (ILT) Panel
Centricitee Grid



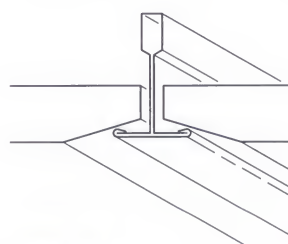
Shadowline Tapered (SLT) Panel
DX Grid



Prisms Panel
Meridian Grid



Prisms Panel
Centricitee Grid



Prisms Panel
DX Grid

This complete line of innovative ceilings features materials, patterns, textures and colors that bring a new level of visual excitement to interior spaces. These specialty products offer the creativity and flexibility of custom ceilings with the convenience of commodity products.

INTEGRATED CEILINGS come to the jobsite pre-engineered, fitted, painted and ready for assembly. Luminous skylights, reflective and fabric-wrapped surfaces, open plenum treatments and acoustical linear metal are just some of the possibilities. Specialty materials include acrylic "glass block" panels and pressed metal panels.

For more information, refer to SA-906, INTEGRATED CEILINGS Specialty Products, in section 09500 of Sweet's Contract Interiors File and General Building and Renovation File. Or call 1-800-950-3859.



Luminous and Reflective Ceilings

1. TRANSPARENCIES Ceilings

The same subtly refracted light play as traditional glass blocks, but with just a fraction of the weight, cost, and installation difficulties of glass.

2. SKYFRAME Ceilings

The feeling of traditional skylights, providing the warmth and brightness of natural daylight.

3. Celebration Ceilings

Sophisticated, mirror-like Celebration ceilings are dramatically space extending. Celebration panels are also available painted or fabric-covered.

4. MIRRAPLANE® Ceilings

Premium grade, highly polished stainless steel MIRRAPLANE ceilings present an almost seamless mirrored plane.

5. VISTA SONIC Ceilings

An exclusive combination of sound absorption and reflective finish.

Linear Metal Ceilings

6. PARALINE® Ceilings

Elegant, imaginative linear metal ceilings, ideal for expansive areas.

7. LINEA® Ceilings

Roll-formed aluminum baffles create a one-directional open-plenum linear ceiling.

SILENT COLLECTION Walls and Ceilings

8. SILENT EXPRESSIONS Ceilings

Custom-embossed panels can express a company logo or other image; or four standard designs can be selected.

9. SILENT 65 and SILENT 95 Walls

Beautiful wall panels with mineral fiber and glass fiber substrates absorb up to 65 percent and 95 percent of sound respectively.

10. SILENT SQUARES® Ceilings

An exclusive combination of luxury and efficient sound control.

Integrated Panel/Grid Systems

11. INTERSECTIONS Ceiling System

Installed at an 11 1/2° angle to the perimeter of the space, this unique system breaks away from the conventional look of rectilinear ceilings.

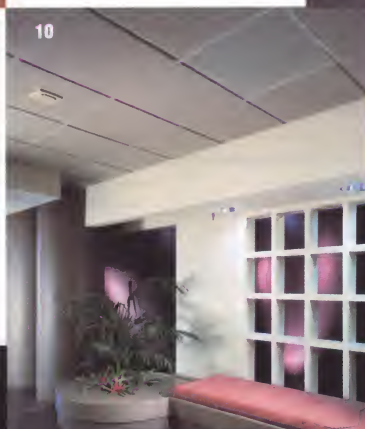
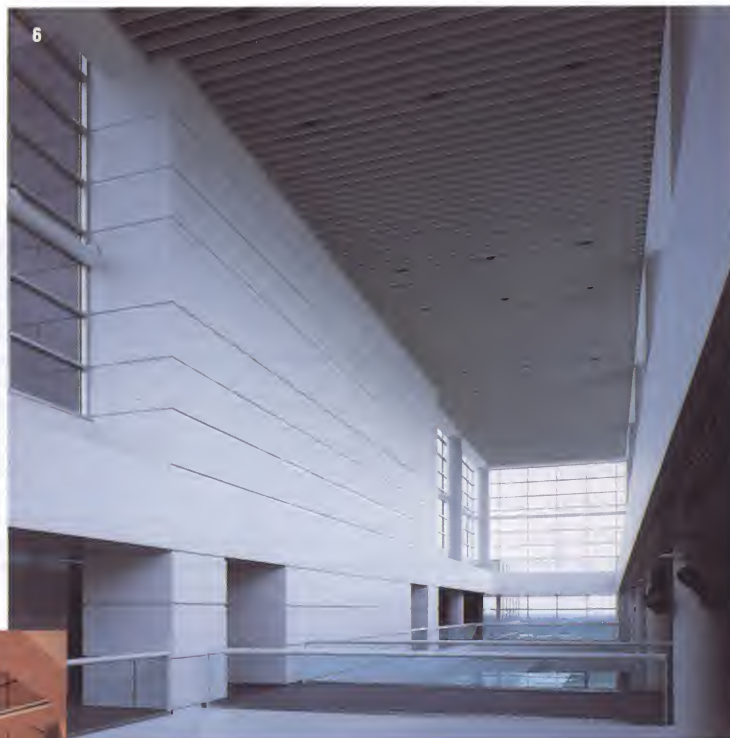
12. IMPRINTS CEILINGS

The art of pressed metal ceiling design for contemporary settings.

13. DONN COORDINATOR® Ceilings

Utilities and services can be incorporated into the runners to eliminate special fixtures.





Product Description ^(A)				Sound Absorption Test Data ^(B)			
Product Line Type	Pattern	Item No.	Size	STC Range	Mounting ^(C)	NRC Range	Mounting
ORION Panels	ORION 210	64111	½"x2"x4'	20-24	CE	.70-.80	E400
	ORION 270	63171	1"x2"x4'	25-29	CE	.90-1.00	E400
Backed ORION Panels	ORION 270	61175	1"x2"x2'	35-39	CE	.80-.90	E400
ORION FIRECODE Panels	ORION 210	68118	¾"x2"x4'	25-29	CE	.70-.80	E400
	ORION 270	68178	¾"x2"x4'	30-34	CE	.70-.80	E400
ACOUSTONE Tile & Panels	GLACIER	701	¾"x12"x12"	25-29	CCF	.70-.80	E400
	"F" Fissured	101	¾"x12"x12"	20-24	ICF	—	—
				30-34	Ad ⁽²⁾	.65-.75	B
				25-29	ICF	.65-.75	E400
Foil-Backed ACOUSTONE Tile & Panels	Chex/16	416	¾"x24"x24"	30-34	CCF	—	—
				40-44	CE ^(4,6)	.60-.70	E400
				40-44	CE ^(4,6)	.55-.65	E400
				40-44	CE ^(3,6)	.70-.80	E400
	"F" Fissured	132	¾"x24"x24"	40-44	CEd ⁽³⁾	—	—
				40-44	CE ^(3,6)	.70-.80	E400
				40-44	CE ^(5,6)	—	—
				35-39	CE	.65-.75	E405
	Frost	414	¾"x24"x24"	40-44	CE ^(3,6)	.65-.75	E400
				35-39	CE ⁽³⁾	.70-.80	E400
ACOUSTONE FIRECODE Tile & Panels	GLACIER	715	¾"x24"x24"	35-39	CCF	.75-.85	E400
		713	¾"x12"x12"	35-39	CCF	.70-.80	E400
	"F" Fissured	138	¾"x12"x12"	35-39	CCF	.70-.80	E400
		141	¾"x24"x24"	40-44	CE ⁽³⁾	.65-.75	E400
AURATONE Panels	Fissured	562	¾"x24"x48"	35-39	CE	.50-.60	E400
				40-44	CEd	—	—
				40-44	CEt	—	—
				35-39	CE	.60-.70	E400
				40-44	CEd	—	—
				40-44	CE ^(3,6)	.50-.60	E400
	Omni Fissured	323	¾"x24"x24"	35-39	CE	.50-.60	E405
		345	¾"x24"x48"	40-44	CE	.60-.70	E400
		343	¾"x24"x48"	35-39	CE ⁽³⁾	.65-.75	E400
	Hi-NRC Omni Fissured	3148	¾"x24"x24"	35-39	CE	.65-.75	E400
		3178	¾"x24"x48"	35-39	CE	.50-.60	E400
	Pin-Perf II	464	¾"x24"x48"	35-39	CE	.60-.70	E400
		—	¾"x24"x48"	35-39	CE	.55-.65	E400
	Nat. Fissured II	56705	¾"x24"x48"	35-39	CE ⁽³⁾	.50-.60	E400
		52704	¾"x24"x24"	35-39	CE	.50-.60	E400
	Surf	661	¾"x24"x24"	35-39	CE	.55-.65	E400
		665	¾"x24"x48"	35-39	CE ⁽⁶⁾	.55-.65	E400
	Aspen	650	¾"x24"x24"	40-44	CE	.55-.65	E400
		3570	¾"x24"x48"	40-44	CE ⁽⁶⁾	.55-.65	E400
	Eight/12 (Omni ILLUS)	3575	¾"x24"x48"	40-44	CE ⁽⁶⁾	.55-.65	E400
		654	¾"x24"x48"	40-44	CE ⁽⁶⁾	.55-.65	E400
	Two/24 (Aspen ILLUS)	652	¾"x24"x24"	40-44	CE ⁽³⁾	.45-.55	E405
		55620	¾"x24"x24"	40-44	CE	.55-.65	E400
AURATONE FIRECODE Panels	Fissured	586	¾"x24"x48"	40-44	CE	.50-.60	E400
		339	¾"x24"x48"	35-39	CE	.50-.60	E400
	Omni Fissured	474	¾"x24"x48"	40-44	CE	.45-.55	E400
		56765	¾"x24"x48"	40-44	CE	.55-.65	E400
	Pin-Perf II	675	¾"x24"x48"	35-39	CE	.55-.65	E400
		667	¾"x24"x24"	35-39	CE	.55-.65	E400
	Nat. Fissured II	669	¾"x24"x48"	35-39	CE	.60-.70	E400
		3845	¾"x24"x24"	35-39	CE	.55-.65	E400
	SUPER-E	56380	¾"x24"x48"	40-44	CE	.55-.65	E400
		56096	¾"x24"x48"	40-44	CE	.55-.65	E400
	Surf	56090	¾"x24"x48"	40-44	CE	.55-.65	E400
		50620	¾"x24"x24"	40-44	CE ⁽³⁾	.45-.55	E400
	Aspen	500	¾"x12"x12"	—	—	.40-.50	D20
		504	¾"x12"x12"	40-44	CCF	.50-.60	E405
	Omni Fissured	304	¾"x12"x12"	40-44	CCF	.60-.70	E400
		320	¾"x12"x12"	40-44	CCF	.50-.60	E400
AURATONE FIRECODE Tile	Fissured	340	¾"x12"x12"	45-49	CCF	.55-.65	E400
		501	¾"x12"x12"	45-49	CCF	.50-.60	E405
	Omni Fissured	660	¾"x12"x12"	40-44	CCF	.50-.60	E400
		515	¾"x12"x12"	45-49	CCF ⁽⁶⁾	.55-.65	E400
	Surf	335	¾"x12"x12"	40-44	CCF	.55-.65	E400
		666	¾"x12"x12"	40-44	CCF	.55-.65	E400
Gypsum Lay-In Panels	Gypsum Lay-In Panels	50441	¾"x12"x12"	40-44	CCF ⁽⁶⁾	.55-.65	E400
		3270	¾"x24"x48"	45-49	CE	—	—

Band Center Frequency Hzzz						Coefficient)	Product Page Reference
125	250	500	1000	2000	4000	Light Reflectance Coefficient ^(A)	
.69	.76	.65	.86	.83	.75	N/A	8
.74	.82	.82	1.05	1.06	1.09	N/A	8
.42	.43	.82	1.13	1.09	1.02	N/A	8
.60	.60	.71	.92	.80	.62	N/A	8
.49	.60	.61	.86	.94	1.04	N/A	8
.56	.76	.57	.80	.94	1.00	.70	13
—	—	—	—	—	—	—	—
.05	.23	.71	.97	.86	.93	—	16
.49	.53	.53	.75	.92	.99	.83	—
—	—	—	—	—	—	—	—
.22	.29	.66	.80	.83	.89	.81	14-15
.23	.25	.64	.77	.83	.80	.76	14-15
.37	.33	.61	1.00	.96	1.03	.67	13
—	—	—	—	—	—	—	—
.44	.33	.68	.98	1.02	1.03	.77	16
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
.29	.29	.62	.96	.95	.95	.69	—
.36	.31	.66	.90	.87	.81	.81	12
.34	.30	.62	1.00	.99	1.03	.67	13
.54	.54	.69	.99	.97	1.10	—	—
.52	.50	.67	.95	.94	.99	.82	16
.15	.26	.68	.93	.89	1.00	.77	—
.42	.34	.44	.72	.67	.64	.78	29
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
.34	.36	.71	.85	.68	.64	.77	—
—	—	—	—	—	—	—	—
.38	.32	.49	.72	.84	.91	.78	27
.29	.31	.46	.71	.69	.69	.79	—
.23	.33	.65	.80	.77	.76	—	—
.42	.51	.68	.85	.79	.78	.84	26
.45	.42	.71	.89	.74	.71	—	—
.35	.36	.48	.76	.66	.59	.77	30
.37	.40	.73	.81	.64	.61	.79	—
.33	.31	.46	.78	.88	.70	.80	27
.43	.32	.48	.65	.72	.73	.79	—
.35	.35	.54	.73	.64	.57	.71	24
.41	.33	.60	.84	.69	.58	.74	—
.29	.37	.60	.73	.64	.66	.70	25
.31	.33	.54	.76	.74	.77	.77	22-23
.33	.30	.57	.75	.71	.77	.77	—
.27	.29	.59	.76	.72	.75	.73	22-23
.30	.32	.63	.78	.73	.76	.71	—
.29	.29	.44	.61	.72	.73	.66	25
.34	.30	.53	.78	.73	.69	—	29
.27	.29	.53	.74	.71	.68	.79	27
.30	.29	.52	.67	.64	.58	.80	30
.29	.29	.57	.74	.66	.58	.83	27
.30	.32	.46	.64	.53	.39	.83	36
.36	.39	.61	.76	.67	.63	.70	24
.34	.29	.56	.80	.70	.65	.74	—
.36	.35	.66	.86	.71	.74	.72	26
.28	.24	.52	.81	.76	.40	.81	32
.30	.30	.53	.86	.71	.47	.76	36
.43	.31	.53	.81	.68	.51	.77	35
.36	.27	.40	.57	.73	.86	.68	25
.17	.54	.30	.42	.50	.48	—	29
.42	.29	.52	.68	.64	.69	.82	—
.50	.36	.76	.73	.69	.72	.82	—
.36	.34	.61	.71	.60	.41	—	27
.32	.38	.61	.74	.62	.48	.78	—
.53	.30	.59	.63	.58	.55	.85	30
.50	.33	.51	.73	.64	.52	.70	24
.59	.33	.45	.78	.79	.70	.80	29
.32	.35	.60	.77	.70	.53	.79	27
.43	.34	.64	.82	.70	.63	.73	24
.48	.34	.64	.74	.71	.80	.64	25
—	—	—	—	—	—	—	34

Test Performance Standards & Agencies

Product performance test results are reported throughout this catalog. Here are the standards and procedures referenced:

AMA 1-II

AMA 1-II: Ceiling Sound Transmission Tests by the Two-Room Method—determines sound transmission between two adjacent rooms when the path is through the two ceilings and the plenum common to both.

American Society for Testing and Materials (ASTM)

ASTM C423-84a: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method—covers the measurement of the sound absorption of acoustical materials in a diffused sound field.

ASTM C523-81: Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer—establishes the method for measuring light reflectance of acoustical materials where the application is primarily for predicting room illumination level.

ASTM C635-88: Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings—establishes materials, tolerances, testing and performance of suspension systems.

ASTM C636-88: Installation of Metal Suspension Systems for Acoustical Tile and Lay-in Panels—describes procedures for the installation of suspension systems and recommends acceptable tolerances.

ASTM E84-81a: Surface Burning Characteristics of Building Materials—describes the "tunnel test" method for comparing surface burning characteristics of the materials tested without specific considerations of all the end use parameters that might affect the surface burning characteristics.

ASTM E119-82: Fire Tests of Building Construction and Materials—prescribes a standard exposure fire test method of controlled extent and severity to determine performance of ceilings, walls, columns, floors and other building members under exposure to fire.

ASTM C117-82: Steady State Thermal Transmission Properties by Means of the Guarded Hot Plate—measures thermal resistance "R" values of building materials.

Federal Specifications (FS)

Federal Specification SS-S-118B: Sound Controlling (Acoustical) Tiles and Panels, June 13, 1980—describes the types of boards and tile. See new ASTM standard E1264.

Underwriters Laboratories Inc. (UL)

Fire Resistance Directory—describes the fire resistance of building assemblies using acoustical materials.

Building Materials Directory—provides Surface Burning Characteristics data: (1) flame spread, (2) smoke developed, during fire exposure.

(A) Data on physical properties for sound control products were obtained by testing at recognized laboratories. Sound-test surfaces were painted. Procedures were according to:

- ASTM C523 for light reflectance
- ASTM C423 for sound absorption
- AMA 1-II for sound attenuation

(B) Sound absorption test specimen mountings: B—adhesive application to gypsum board; D20—stapled to wood furring strips; E400 or E405—metal suspension system. Mountings are designations from ASTM Standard E795-83.

(C) Sound attenuation test specimen mountings, coded: (1st letter) Ad—Adhesive attachment, C—Continuous at partitions, I—Interrupted at partitions; (2nd letter) C—Concealed suspension system, E—Exposed suspension system; (3rd or 4th letter) F—Flat splines, T—Tee splines, X—accessible feature; a—one layer 1 1/2" THERMAFIBER® sound attenuation fire blankets, laid on ceiling continuous; d—two layers 1 1/2" THERMAFIBER sound attenuation fire blankets, laid on ceiling in an 8-ft width centered over the partition; l—inverted-T plenum barrier of 3" THERMAFIBER sound attenuation fire blankets, centered above partition continuous.

(D) Light reflectance coefficients (1.00=100% reflected) are classified by Fed. Spec. SS-S-118B/ASTM E1264 into Grades as follows: LR 1, .75 or greater; LR 2, .70-.74; LR 3, .65-.69; LR 4, .60-.64; less than .60, ungraded.

(2) Tile adhesively attached to 1/2" gypsum panels screw-attached to indirect hung suspension, and interrupted at partition.

(3) Shadowline (rabbeted) edge configuration.

(4) USG Profile grid (no longer available).

(5) Interline (rabbeted) edge configuration, FINELINE exposed grid.

(6) Tested at USG Corporation Acoustical Systems Laboratory and witnessed by outside consultants.

FIRE RATED SYSTEMS

UL Design No.	Assembly Rating	Approved Types	Tile/Panel Sizes	Approved Light Fix. Protection	Maximum Fix. Size % Ceiling Area	Duct Area Sq. In. Per 100 Sq. Ft. of Ceiling Area	Assembly Construction Details
FIRECODE ACOUSTONE Ceiling Tile							
A010	2 hr, R 1½ hr, UR 1½ hr, URB	G or W AP	12 by 12	THERMAFIBER LFPB Box	2 by 4 16%	50 sq. in.	Floor/Ceiling; 2½" Concrete Cellular Deck; Beam W8 x 31 min
G011	2 hr, R 2 hr, UR 3 hr, URB	AP	12 by 12 12 by 24	THERMAFIBER LFPB Tent AURATONE Tent	2 by 4 15%	57 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W8 x 24 min
G017	3 hr, R 2 hr, UR	AP	12 by 12	N/A	None	50 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c.
G018	2 hr, R 2 hr, UR	G or W AP	12 by 12	N/A	None	50 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c.
G020	1½ hr, R 1½ hr, UR	G or W AP	12 by 12	N/A	None	50 sq. in.	Floor/Ceiling; 2" Concrete Metal Lath; 10" Bar Joists 24" o.c.
G037	2 hr, R 2 hr, UR 2 hr, URB	AP	12 by 12	THERMAFIBER LFPB Tent	2 x 4 24%	288 sq. in.	Floor/Ceiling; 2½" Concrete Steel Deck; 8" Bar Joists 24" o.c. Beam W6 x 25
L003	1 hr, UR Finish Rating 17 min.	G or W AP	12 by 12	N/A	None	None	Floor/Ceiling; Wood Floor and Joists 2 x 10; 16" o.c.
FIRECODE ACOUSTONE Ceiling Panels							
G228	2 hr, R 2 hr, UR 2 hr, URB	AP	2 by 2	THERMAFIBER LFPB AURATONE Tent	2 x 2 12%	57 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W8 x 31
FIRECODE Gypsum Lay-In Panels							
G222	2 hr, R 2 hr, UR 2 hr, URB	FC-CB	2 by 2	THERMAFIBER LFPB Tent; AURATONE Tent	2 by 4 12%	57 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W8 x 24
G259	1½ hr, R 1½ hr, UR 1½ hr, URB	FC-CB	2 by 4	Gypsum Bd 3 Sided	2 by 4 16%	57 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W8 x 31
L206	1 hr, UR Finish Rating 17 min.	FC-CB	2 by 2 2 by 4	THERMAFIBER LFPB Tent; AURATONE Tent	2 by 4 8%	110 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10; 16" o.c.
FIRECODE AURATONE Tile							
A003	3 hr, R; 3 hr, UR 3 hr, URB	FR-81	12 by 12 12 by 24	THERMAFIBER LFPB	2 by 4 8%	None	Floor/Ceiling; 2½" Concrete Cellular Deck; Beam W10 x 25
A-009	3 hr, R; 3 hr, UR 4 hr, URB	GR	12 by 12	THERMAFIBER LFPB Box	2 by 4 16%	110 sq. in.	Floor/Ceiling; 2½" Concrete Cellular Deck; Beam W8 x 40
G002	2 hr, R 2 hr, UR	FR-81	12 by 12 12 by 24	Mineral Fiberboard Box	2 by 4 24%	576 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c.
G007	2 hr, R; 2 hr, UR 2 hr, URB	FR-81	12 by 12; 12 by 24 24 by 24	THERMAFIBER LFPB	1 by 4—16% or 2 by 4—24%	196 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W10 x 21
G008	2 hr, R 2 hr, UR 2 hr, URB	GR	12 by 12 to 24 by 24	THERMAFIBER LFPB Tent	2 by 4 16%	288 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W8 x 31
G019	2 hr, R 2 hr, UR	GR	12 by 12	THERMAFIBER LFPB Box	2 by 4 24%	113 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c.
L006	1 hr, UR Finish Rating 12 min.	FR-81	12 by 12	THERMAFIBER LFPB Box	1 by 4, 20 by 48 20 by 60—14%	Linear; 10 ft. per 100 sq. ft.	Floor/Ceiling; Wood Floor and Metal Lath; Joists 2 x 10; 16" o.c.
FIRECODE AURATONE, ORION, and ECLIPSE Panels							
A207	3 hr, R; 3 hr, UR 4 hr, URB	GR-1 FR-83; FR-X1	2 by 4	THERMAFIBER LFPB Tent	2 by 4 16%	113 sq. in.	Floor/Ceiling; 2½" Concrete Cellular Deck; Beam W8 x 40
G211	3 hr, R 3 hr, UR	GR-1 FR-83	2 by 2 2 by 4	THERMAFIBER LFPB Tent	2 by 4 16%	113 sq. in.	Floor/Ceiling; 3" Concrete Metal Lath; 10" Bar Joists 24" o.c.
G213	3 hr, R; 3 hr, UR 3 hr, URB	GR-1 FR-83; M; FR-X1	2 by 4	THERMAFIBER LFPB Type FR	2 by 4 24%	154 sq. in.	Floor/Ceiling; 3½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W6 x 12
A204	2 hr, R; 2 hr, UR 2 hr, URB	GR-1; FR-83 FR-4; M; FR-X1	2 by 4	THERMAFIBER LFPB Type FR; Acoustical Tent	2 by 4 24%	113 sq. in.	Floor/Ceiling; 3" Concrete Cellular Deck; Beam W8 x 28
D201	2 hr, R 2 hr, UR 3 hr, URB	GR-1 FR-83; FR-4; M FR-X1; FR-X2	2 by 4; 2 by 2 20 by 60	THERMAFIBER LFPB Type Floor Tent Acoustical Tent	2 by 4 24%	576 sq. in.	Floor/Ceiling; 2½" Concrete Cellular or Fluted Deck Beam W8 x 28
D209	2 hr, R 1½ hr, UR 1½ hr, URB	GR-1 FR-83; FR-4 FR-X1; FR-X2	2 by 2 2 by 4	THERMAFIBER LFPB Type FR	2 by 4 8%	None	Floor/Ceiling; 2½" Concrete Cellular or Fluted Deck Beam W8x 28
G202	2 hr, R 2 hr, UR	GR-1 FR-83; FR-X1 FR-X2	2 by 2; 2 by 4	THERMAFIBER LFPB Type FR Acoustical Box	20 by 48, 24 by 48 20 by 60—24% HID 2 by 2—12%	576 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c.
G204	2 hr, R 2 hr, UR 2 hr, URB	GR-1 FR-83; FR-84 FR-4; M; FR-X1 FR-X2	2 by 2; 2 by 3 2 by 4 20 by 60 30 by 60	THERMAFIBER LFPB Type FR Acoustical Box	24 by 60 24 by 48 24 by 24 24%	2 by 24, 2 by 3 113 sq. in. 2 by 4, 30 by 60 576 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath on Deck 10" Bar Joists 30" o.c. Beam W6 x 12
G215	2 hr, R 2 hr, UR 2 hr, URB	GR-1; FR-83 FR-4; FR-84 FR-X1; FR-X2	2 by 2 2 by 4 20 by 60	THERMAFIBER LFPB Type FR	20 by 48 20 by 60—24% HID 2 by 2—2%	154 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath; 10" Bar Joists 24" o.c. Beam W10 x 21
G227	2 hr, R 2 hr, UR 3 hr, URB	GR-1 FR-83	2 by 2 2 by 4	Thermafiber LFPB Tent	2 by 4 16%	57 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath on Deck 10" Bar Joists 24" o.c. or Hambro System; Beam W8 x 31
G231	2 hr, R 2 hr, UR 3 hr, URB	¾" GR-1	2 by 2 to 30 by 60		2 by 4 16%	57 sq. in.	Floor/Ceiling; 2½" Concrete Metal Lath on Deck 8" Bar Joists 24" o.c.

UL Design No.	Assembly Rating	Approved Types	Tile/Panel Sizes	Approved Light Fix. Protection	Maximum Fix. Size % Ceiling Area	Duct Area Sq. In. Per 100 Sq. Ft of Ceiling Area	Assembly Construction Details
FIRECODE AURATONE, ORION, and ECLIPSE Panels							
J201	2 hr, R 2 hr, UR	GR-1; FR-83; FR-84 FR-4; M; FR-X1; FR-X2	2 by 2; 2 by 4 20 by 60	THERMAFIBER LFPB Type FR Acoustical Box	2 by 4 24%	576 sq. in.	Floor/Ceiling; 2½" Concrete With 6" Pan Joists
J202	2 hr, R 2 hr, UR	GR-1; FR-83 FR-X1; FR-X2	2 by 2 2 by 4	THERMAFIBER LFPB Tent; Acoustical Box	2 by 4 14%	57 sq. in.	Floor/Ceiling; Precast Concrete 2" Deck, Stems 4" o.c.
L211 (P237)	2 hr, UR Finish Rating 75 min.	FR-4	2 by 4	THERMAFIBER LFPB Type FR	1 x 4—16% 2 x 2—20% 2 x 4—24%	144 sq. in.	Floor/Ceiling Wood Floor and Joists 2 x 10 16" o.c. ½" Wallboard Ceiling w/ 6" Fiberglass Insulation
P237	2 hr, R 2 hr, UR 2 hr, URB	FR-4	2 by 4	THERMAFIBER LFPB Type FR	1 x 4—16% 2 x 2—20% 2 x 4—24%	144 sq. in.	Roof/Ceiling; Unlimited Insulation Steel Deck; 8" Bar Joists 48" o.c. ½" Wallboard Ceiling w/ 6" Fiberglass Insulation
P241 (P237)	2 hr, R, 2 hr, UR	FR-4	2 by 4	THERMAFIBER LFPB Type FR Box	1 x 4—16% 2 x 2—20% 2 x 4—24%	144 sq. in.	Roof/Ceiling Insulating Concrete; Steel Deck 10" Bar Joists 6" o.c. ½" Wallboard Ceiling w/ 6" Fiberglass Insulation
G264	1½ hr, R 1½ hr, UR	GR-1 FR-83; FR-X2	2 by 2 Interline Edge	Acoustical 3 sided	2 by 2 24%	113 sq. in.	Floor/Ceiling; 2½" Concrete Steel Deck; 8" Bar Joists 24" o.c.
P230	1½ hr, R 1 hr, UR 1 hr, URB	GR-1 FR-83 FR-X1; FR-X2	2 x 4	THERMAFIBER LFPB Type FR Acoustical Box	2 by 4 24%	255 sq. in.	Roof/Ceiling; Unlimited Insulation Wallboard Gypsum; Steel Deck 10" Bar Joists; 6" o.c. Beam W6 x 12
G201	1 hr, R 1 hr, UR	GR-1 FR-83	2 x 2; 2 x 4 FR-X2 FR-X1	None	2 x 4 8%	None	Floor/Ceiling; 2" Concrete Metal Lath; 10" Bar Joists 24 to 78" o.c.
L202	1 hr, UR Finish Rating 15 min.	GR-1; FR-83 FR-4; M; FR-X1	2 x 4 24 x 60	THERMAFIBER LFPB Tent Acoustical Box	2 by 4 16%	110 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10—16" o.c.
L206	1 hr, UR Finish Rating 17 min.	GR-1 FR-X1; FR-X2	2 x 4	THERMAFIBER LFPB Tent; Acoustical Box	2 by 4 8%	110 sq. in.	Floor/Ceiling; Wood Floor and Joists 2 x 10—16" o.c.
L212 (P238)	1 hr, UR Finish Rating 17 min.	FR-4	2 x 2 2 x 4	Acoustical Box	1 x 4—12% 2 x 2—16% 2 x 4—24%	576 sq. in.	Floor/Ceiling Wood Floor and Joists 2 x 10—16" o.c.
P201	1 hr, UR 1 hr, UR 1 hr, URB	FR-83 FR-X1 M	2 x 4	N/A	None	None	Roof/Ceiling; Steel Deck ¾" Insulation 10" Bar Joists 4' o.c. Beam W8 x 17
P202	1 hr, R ¾ hr, UR 1 hr, URB	FR-83 FR-X1 M	2 x 4	THERMAFIBER LFPB Box Acoustical Box	2 x 4 16%	57 sq. in.	Roof/Ceiling Steel Deck 1" Insulation 8" Bar Joists 4' o.c.
P203	¾ hr, R ¾ hr, UR; ¾ hr, URB	FR-83; M FR-X1	2 x 4	THERMAFIBER LFPB Type FR Acoustical Box	2 x 4 24%	113 sq. in.	Roof/Ceiling; Steel Deck 1" to 2" Insulation; 8" Bar Joists 5' o.c.
P214	1 hr, R 1 hr, UR 1 hr, URB	¾" GR-1	2 x 2 2 x 4	THERMAFIBER LFPB Tent Acoustical Box	2 x 4 16%	57 sq. in.	Roof/Ceiling; Steel Deck ¾" to 1" Insulation; 10" Bar Joists 6' o.c.
P235	1 hr, R 1 hr, UR 1 hr, URB	GR-1 FR-83 FR-84 FR-X1	2 x 4	THERMAFIBER LFPB Type FR	2 x 4 24%	144 sq. in.	Roof/Ceiling; Foamed Plastic Insulation; Wallboard Gypsum Steel Deck, 10" Bar Joists 6' o.c. Beam W8 x 15
P238	1 hr, R 1 hr, UR 1 hr, URB	FR-4	2 x 2 2 x 4	Acoustical Box	1 x 4—12% 2 x 2—16% 2 x 4—24%	576 sq. in.	Roof/Ceiling; Unlimited Insulation Steel Deck, 8" Bar Joists 4' o.c. Beam W6 x 12, Ceiling Panels Backloaded w/ 6" Fiberglass
P245 (P238)	1 hr, R 1 hr, UR	FR-4	2 x 2 2 x 4	Acoustical Box	1 x 4—12% 2 x 2—16% 2 x 4—24%	576 sq. in.	Roof/Ceiling ¾" Insulation over 2" Bldg Units 14" Bar Joists 7' o.c.; Ceiling Panels Backloaded w/ 6" Fiberglass
P246	1 hr, R 1 hr, UR 1 hr, URB	GR-1 FR-83; FR-84 FR-X1; FR-X2	2 x 2 2 x 4 20 x 60	THERMAFIBER LFPB Type FR	2 x 2—20% 2 x 4—24%	576 sq. in.	Roof/Ceiling; Insulating Concrete over Foamed Plastic, Steel Deck; 8" Bar Joists 6' o.c.; Beam W8 x 15
P255	1 hr, R 1 hr, UR 1 hr, URB	GR-1 FR-X1 FR-X2	2 x 2 2 x 4	Acoustical Box	2 x 4—24%	57 sq. in.	Roof/Ceiling; Insulating Concrete over Foamed Plastic, Steel Deck; 8" Bar Joists 6' o.c.; Beam W8 x 15
P257	1 hr, UR	GR-1 FR-83; FR-84 FR-X1; FR-X2	2 x 2 2 x 4	THERMAFIBER LFPB Type FR Acoustical Box	2 x 4 25%	255 sq. in.	Roof/Ceiling; 4½" Insulation Wallboard Gypsum over Steel Deck, 7½" Steel "C" Joists

FIRECODE ACOUSTONE Tile

G = Frost, GLACIER, "F" Fissured ceiling tile
W = Frost, GLACIER, "F" Fissured ceiling tile
AP = Frost, GLACIER, "F" Fissured ceiling tile

FIRECODE ACOUSTONE Panels

AP = LINEAR EXPRESSIONS, Sandrift, Frost, GLACIER, "F" Fissured ceiling panels

FIRECODE Gypsum Lay-In Panels

FC-CB = Gypsum Lay-In ceiling panels

FIRECODE AURATONE Tile

GR = Allegro, Calypso, Aurora, Omni Fissured, Fine Fissured, Corona, Fissured ceiling tile
FR-81 = Omni Fissured, Fine Fissured, Corona, Fissured ceiling tile

FIRECODE AURATONE, ORION, and ECLIPSE Panels

GR-1 = ILLUSIONS, Allegro, Calypso, Surf, Aspen, Omni Fissured, Natural Fissured II, Fine Fissured, Corona, Fissured, Pin Perf. II, SUPER-E ceiling panels
FR-83 = DESIGNER SQUARES, Aurora, Omni Fissured, Natural Fissured II, Fine Fissured, Corona, Fissured, Pin Perf. II, Pebbled, ROCK FACE, IMPACTION, CLEAN ROOM ceiling panels
FR-84 = PREMIER Fine Fissured, PREMIER Natural Fissured II ceiling panels
FR-4 = CERAMIC HERITAGE ceiling panels
M = METAL FACE ceiling panels (2' x 4' panels only)
FR-X1 = ORION ceiling panels
FR-X2 = ECLIPSE ceiling panels

Fire Protection—THERMAFIBER kits provide maximum protection around light fixtures. Made from mineral fiber, THERMAFIBER insulation's melt point is over 2000°F, far higher than glass fiber. Surface burning characteristics of THERMAFIBER insulation are flame spread—15, smoke developed—0 (ASTM E84 test procedure). THERMAFIBER insulation has been fire tested in dozens of ACOUSTONE and AURATONE ceilings and rated up to 3 hours.

THERMAFIBER insulation is lightweight (.63 lb/ft²), so it will not overstress conventional grid systems. Plus its optimum density reduces sound transmission and heat leaks through the ceiling.

THERMAFIBER light fixture protection kits come already sized for assembly around standard 2' x 4' fixtures. Or they can be easily cut with a utility knife to fit 1' x 4' or 2' x 2' fixtures or other special size fixtures. THERMAFIBER light fixture protection is easily wire-tied and suspended over fixtures. Each kit contains enough material for protection of 10 2' x 4' fixtures, 17 2' x 2' fixtures, or 20 1' x 4' fixtures.

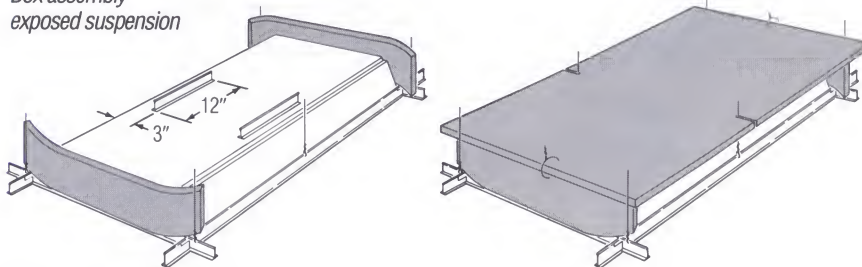
Sound Attenuation—Plenum sound barriers improve sound attenuation by reducing flanking sound.

For overlaid insulation, two installation methods are recommended: a single layer of 1½" Thermafiber sound attenuation fire blanket insulation (not shown) can be placed over the entire ceiling; or a double layer 1½" (or single layer 3") THERMAFIBER sound attenuation fire blanket insulation can be overlaid in a 4'-width along each side of partitions (see drawing).

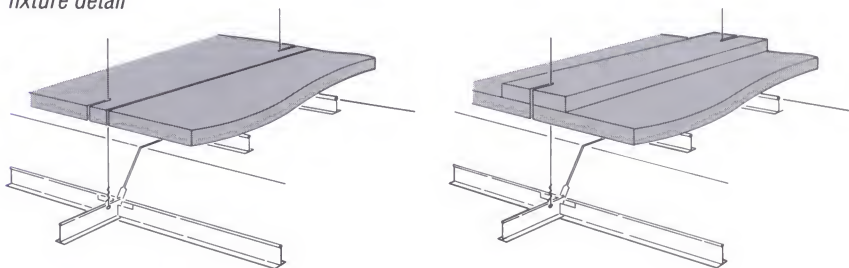
Formed semi-rigid insulation barriers offer greater acoustical efficiency and economy, making them preferred to overlaid insulation. Three types are available: vertical barrier; inverted "T" barriers; and tent barriers.

Light Fixture Protection for Fire-Rated Ceilings

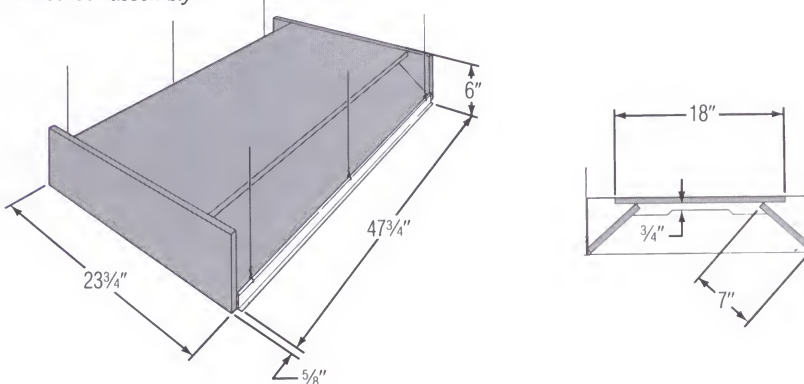
*Box assembly
exposed suspension*



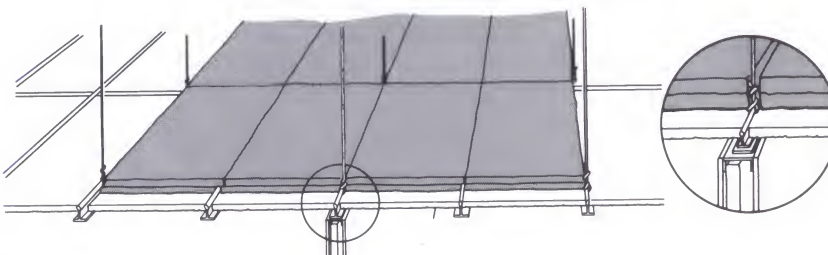
*Tandem light
fixture detail*



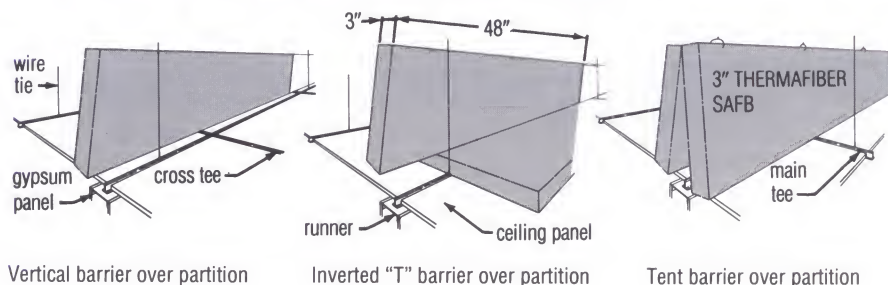
Vented-box assembly



Plenum sound barriers—field-fabricated from 3" thick, 2' x 4' THERMAFIBER sound attenuation fire blankets installed longitudinally. Field-cut 2' width as necessary to fit plenum depth, with 3" to 4" allowable clearance above blankets to maintain full sound attenuation effectiveness (test values). Check for adequacy of plenum air flow, if required.



Mounting CEd—STC's in the 40-44 range with 2' x 2' ACOUSTONE GLACIER panel or 2' x 4' AURATONE Fissured panel ceilings (illustrated, also see text and page 46 for individual product STC ranges).



Vertical barrier over partition

Inverted "T" barrier over partition

Tent barrier over partition

PRODUCT LIMITATIONS

Environmental Conditions—Do not use ACOUSTONE, AURATONE, or Gypsum Lay-In panels in 1) high humidity, 2) areas below wainscot height, or 3) areas otherwise exposed to impact, abrasion or tampering. These products are sized and designed for use within the standard occupancy range of temperature and humidity, 60°-85°F, no more than 75% RH (90°F/90% RH for CERAMIC HERITAGE and SUPER-E panels). Humidity can greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours. For Gypsum Lay-In panels, provide ventilation in enclosed spaces above panels. Do not use ORION and ECLIPSE ceiling products, or PREMIER Nubby or HI-LITE glass fiber acoustical ceiling products where a concentration of chemical fumes is present, in areas exposed to impact or abrasion, in coolers or cold storage rooms or adjacent areas, above swimming pools, or where radiant temperature exceeds 140°F.

Installation—Install ACOUSTONE and AURATONE ceiling products under ambient conditions within the

standard occupancy range, after residual moisture from plaster, concrete and terrazzo work has dissipated. Allow time for dimensional changes in those products stored at temperature/humidity conditions well outside of those recommended for service. With increases in temperature/humidity, ACOUSTONE and AURATONE panels expand (up to 1/4 in/ft at 80°F/90% RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersize, but expand to normal when standard ambient conditions return.

For some patterns, if perimeter panels must be cut smaller, the abutting edge must be field-rabbetted or the wall angle must be lowered 3/8".

Foil-back ACOUSTONE tile should not be adhesively applied.

ORION and ECLIPSE products are sized and designed for use within the standard occupancy range of temperature and humidity, up to 90°F, no more than 90% RH.

Overlaid Material—Although ACOUSTONE and AURATONE products are sag-resistant, loading aggravates the tendency to sag. To prevent objectionable sag, limit

overlaid insulation or other material to .75 lb/ft² maximum (3.50 lb/ft² maximum on SUPER-E products, .25 lb/ft² for ORION and ECLIPSE products).

Fire-Rating—UL Design fire rating requires: (1) FIRECODE formulation products, (2) fire-rated suspension system, (3) entire ceiling installation as specified in UL Design, (4) ceiling be free of overlaid material not specified in the design.

Suspension System—For panels in exposed grids in high-humidity applications, use aluminum or galvanized suspension systems. For exterior applications, suspension system should be approved by manufacturer. Grid tee deflection should be limited to 1/600 of span, maximum, for intended esthetics in ceiling applications.

Color Uniformity—Colors are checked by spectrophotometric analysis according to the "L.a.b." chromaticity coordinates system. Color-matching of coatings and fabrics is considered well within normally accepted commercial tolerance.

Product Lots—Texture, room lighting and subjectivity of observer can affect perceived color. In any unbroken area of ceiling, all material should be used from the same product lot (indicated by lot number on each carton) to minimize the effect.

Fire Protection Accessory Limitations—**Fire Rating.** Fire ratings may be nullified by overlaid material unless material was specified in the UL Design.

Overlaid Weight. Possibility of sag in panels (see "Environmental Conditions" above) usually limits overlaid weight, but ceiling/suspension strength is another limiting factor.

10-Year Limited Warranty—USG Interiors, Inc. warrants its ORION and ECLIPSE ceiling panels and PREMIER glass fiber ceiling panels for 10 years from the date of installation against sagging, warping, shrinking or delamination of finished surfaces subject to normal, allowable manufacturing tolerances and further conditions. For details, contact your sales representative.

GOOD DESIGN PRACTICES

Storage Conditions—Ceiling material storage time at the jobsite should be as short as possible, and environmental conditions should be as near as possible to those specified for occupancy (see "Occupancy Conditions" below).

Excess humidity during storage can cause expansion of acoustical material and possible warp, sag or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.

Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and

panels, store them at a location where temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

Occupancy Conditions—These acoustical and suspension products are designed for installation and use under standard occupancy conditions of temperature and humidity (60°-85°F, no more than 75% RH).

Maintenance—Clean with a vacuum cleaner or chemical rubber sponge (used dry). White panels with optional plastic coating can also be washed with a mild detergent and water.

To repaint, spray a thinned, nonbridging vinyl-acrylic flat wall paint. Repaint plastic coated surfaces with a nonbridging vinyl-acrylic flat enamel or other nonbridging paint, properly formulated to retain natural semi-gloss appearance. The type of paint selected and the method of

application can alter the acoustical performance and fire ratings of any acoustical product. Therefore, USG Interiors cannot guarantee that the modified panels/tile will match the published performance.

Insulation—The roof deck above acoustical ceiling products must be properly vented and insulated, and incorporate a vapor retarder to prevent condensation and staining of the ceiling. Insulation blankets can be overlaid on the ceiling, so long as they do not exceed .75 lb/ft² (.25 lb/ft² for ORION and ECLIPSE ceiling products), but under some conditions can cause objectionable panel sag. The space above must always be adequately ventilated to prevent moisture buildup in the insulation. In addition, overlaid material of any kind inhibits access through the ceiling, and nullifies an assembly's fire rating unless specified in the UL Design or locally approved.

Critical Lighting—Do not use square edge (SESK) tile in concealed systems for ceilings subjected to strong sidelighting. Strong sidelighting with slight angle of incidence to ceiling surface greatly exaggerates surface irregularities. It demands careful, precise installation to avoid job problems and owner complaints. Effects can be minimized by using bevel edge or rough surface patterns instead of smooth-surfaced or square edge units, or by employing an exposed suspension. Shadows often can be eliminated or softened with draperies or blinds.

Direct Attachment of Tile—With existing drywall ceilings, direct staple-attachment is the easiest, most economical method, requiring only that the existing ceiling be a minimum 1/2" thick and in a flat plane without bumps or ridges, and that the tile have a suitable stapling flange. Double stapling with 3/8"-long divergent point staples is recommended. The adhesive attachment method, using an adhesive in accordance with ASTM D1779 or Federal Spec. MMM-A-00150B

(GSA-FSS), is preferred when the existing drywall ceiling is not flat enough for direct stapling. See Architectural Specifications, section 3.2. Note: foil-backed ACOUSTONE tile should not be adhesively applied.

Color/Texture/Dimension Uniformity—Variations in color and fissure size in acoustical ceiling products are natural; they are of small consequence within a batch but more obvious from batch to batch. Jobs should be planned so that material is ordered and shipped at one time. In

accordance with industry practice, acoustical ceiling product dimensions are nominal.

Fire-Rating—To qualify for UL Design ratings, ceiling must: include FIRECODE tile or panels, be constructed as described in the specified UL Design, include a fire-rated suspension system. It usually must be free of overlaid material such as insulation (see "Product Limitations").

System Performance—USG Interiors, Inc. will provide test certification for published fire, sound and structural data, covering systems designed and constructed according to its published specifications. Tests are conducted on Company products to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.

ARCHITECTURAL SPECIFICATIONS

Note to specifier: For complete specifications, refer to USG Interiors, Inc. technical literature or call 1-800-950-3859 for assistance.

Part 1: General

1.1 Scope—Specify areas to receive this acoustical treatment.

1.2 Qualifications

Construction conditions shall comply with ASTM C636. Acoustical material and suspension systems, including all necessary hangers, grillage, splines and supporting hardware, shall be furnished and installed by an acoustical contractor.

1.3 Delivery and Storage of Materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Immediately before installation, tile and panels shall be stored for a sufficient time to stabilize temperature and humidity conditions ambient during installation and anticipated for occupancy.

1.4 Environmental Conditions

Installation of ACOUSTONE and AURATONE acoustical tile and panels and suspension systems shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated. Installation of Gypsum Lay-In panels shall not begin in an exterior application until protection

from direct exposure to water and weather has been provided. ORION and ECLIPSE ceiling products and PREMIER glass fiber ceiling panels can be installed and used in temperature and humidity conditions up to 90°F, no more than 90% RH.

1.5 Design Conditions

Systems shall be rated NRC () in accordance with ASTM C423 and STC () in accordance with AMA 1-II as tested by an independent agency.

Part 2: Products

2.1 Frost Renditions

Frost Renditions mineral fiber ceiling panels by USG Interiors, Inc., () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (page 5) for pattern, item number, color, size, edge, NRC and STC options.

2.2 ECLIPSE

ECLIPSE mineral fiber ceiling (panels) (FIRECODE panels, approved for UL Design No. []) (tile) (FIRECODE tile, approved for UL Design No. []), by USG Interiors, Inc., having 10-year warranty against sag and fine, non-directional pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (pages 6-7) for pattern, item number, color, size, edge, NRC and STC options.

2.3 ORION

ORION (210) (220) (230) (270) mineral fiber ceiling (panels) (FIRECODE panels, approved for UL Design No. []), by USG Interiors, Inc., having laminated (Nubby fabric)

(vinyl) surface, () pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (page 8) for pattern, item number, color, size, edge, NRC and STC options.

2.4 ACOUSTONE

ACOUSTONE molded mineral fiber (tile) (FIRECODE tile, approved for UL Design No. []), with non-breathing factory-applied foil backing) (panels, with non-breathing factory-applied foil backing) (FIRECODE panels, approved for UL Design No. []), with non-breathing factory-applied foil backing), by USG Interiors, Inc., free of mechanical perforations, () pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (pages 10-16) for pattern, item number, color, size, edge, NRC and STC options.

2.5 AURATONE

AURATONE water-felted mineral fiber (tile) (FIRECODE tile, approved for UL Design No. []), (panels), (FIRECODE panels, approved for UL Design No. []), by USG Interiors, Inc., () pattern, () item number, () color, () size, () edge, NRC range (), STC range ().

Note to specifier: Refer to product descriptions (pages 18-30) for pattern, item number, color, size, edge, NRC and STC options.

2.6 Special-Function

AURATONE (FIRECODE) special function products by USG Interiors, Inc., () item number, () color, () size, () edge, NRC range (), STC range ().

2.6.1 Abuse-Resistant FIRECODE panels, approved for UL Design No. (), (ROCK FACE pattern) (IMPACTION System).

2.6.2 Environment-Resistant FIRECODE panels, approved for UL Design No. (), (CERAMIC HERITAGE) (METAL FACE [perforated] [unperforated]) (SUPER-E [perforated] [unperforated]) pattern.

2.6.3 Sanitary Condition FIRECODE panels, approved for UL Design No. (), CLEAN ROOM pattern (Class 100, unperforated) (Class 10,000-100,000, perforated).

2.7 Gypsum Ceiling Panels

FIRECODE core Gypsum Lay-In panels by USG Interiors, Inc., () item number, unit facing (white vinyl stipple pattern) (unfinished paper) (painted), () size, square edge.

2.8 Extra Sound Absorbent

PREMIER glass fiber substrate panels by USG Interiors, Inc., () item number, () size, () edge, (Nubby) (Twill) (Kapok) laminated facing, () NRC, in white color.

Note to specifier: Refer to product descriptions (pages 32-36) for item number, color, size, edge, NRC and STC options.

2.9 Fire Rating Accessories

By USG Interiors, Inc.:

2.9.1 THERMAFIBER Light Fixture Protection, (box) (tent) (vented-box) type assembly approved for UL Design No. (), of semi-rigid spun mineral-fiber board, nom. 1 1/4" thick, unfaced and unbacked.

2.9.2 THERMAFIBER Fire Protection Batts, approved light-fixture protection field-fabricated to UL

Design No. () requirements from flexible spun mineral-fiber mats, 1½" thick, unfaced and unbacked.

2.10 Sound Rating Accessories
THERMAFIBER SAFB insulation of spun mineral-fiber, semi-rigid mats with square-cut edges, unfaced and unbacked, by USG Interiors, Inc.:

2.10.1 Installed over Partition Stud Cavities, (1½") (3") x 2' x 4' sizes, (single-layer on entire ceiling) (double-layer on ceiling in 8'-wide strips centered on partitions).

2.10.2 Installed as Plenum Barriers, 3" x 2' x 4" sizes, of (vertical) (inverted "T") (tent) type.

2.10.3 Overlaid on Ceiling, 1½" x 2' x 4' sizes, (single-layer on entire ceiling) (double-layer on ceiling in strips extending 4' to each side of partitions).

2.11 DOWN Suspension Systems
By USG Interiors, Inc.:

2.11.1 Fire-Rated Concealed Suspension, meeting ASTM C635. (DX tee system with splines that engage adjacent tile.) (Rigid X tee system with screw-applied gypsum board.)

2.11.2 Fire-Rated Exposed Suspension, (DXL) (CENTRICITEE DXLT) (FINELINE DXLF) (Environmental ZXLA Grid System), per UL Design No. (), all main and cross tees meeting "intermediate" or "heavy" duty classifications of ASTM C635, () color.

2.11.3 Class A Exposed Suspension, meeting "intermediate" or "heavy" duty main tee structural standards of ASTM C635, () color.

2.11.4 Corrosion-Resistant Exposed Suspension, (DXLA) (HIGHLINE) (Environmental ZXA Grid System) (Environmental AX Grid System), () color.

2.11.5 Narrow ½" Reveal Fineline 1/8" Suspension, accepts Fineline edge panels, () color.

Note to specifier: Refer to product descriptions (pages 38-39) for color options.

Part 3: Execution

3.1 Suspended
Install acoustical material and suspension system, including necessary hangers, grillage, splines and other supporting hardware, in accordance with ASTM C636, all code requirements and sound industry practices (such as Cisca guidelines).

3.2 Adhesive

Apply tile with an adhesive manufactured specifically for this purpose, in accordance with manufacturer's directions, and/or as follows. Brush off any loose dust from tile back surfaces and prime them where adhesive is to be applied. This lays down any residual dust to assure good adhesion. Prime only a 2-3" circle near each corner by buttering a very thin coat of adhesive with trowel blade at a 45° angle. Then apply a walnut-sized dab of adhesive to each of the 4 circles and press tile firmly in place. Insert splines in kerfs at corners of units. Foil-backed ACOUSTONE tile should not be adhesively applied.

3.3 ACOUSTONE "F" Fissured Tile
Intermix tile from 4 or more cartons to obtain uniform distribution of fissure variations.

3.4 The ILLUSION Ceiling Series Exposed Grid Suspension
Install inverted tee, direct-hung, exposed surface system having low-gloss finish and color of The ILLUSION Ceiling Series. System should meet "intermediate" or better structural standards of ASTM C635.

3.5 Fire-Rated Suspension
Install suspension per UL Design No. () and ASTM C636.

3.6 Light Fixture Protection
Install light fixture protection and necessary hangers and ties in accordance with UL Design No. () and ASTM C636.

3.7 Ceiling Sound Insulation
Lay blankets flat on ceiling panels and tightly fit around all grillage, hangers and other vertical penetrations:

3.7.1 Single-Layer over entire ceiling.

3.7.2 Double-Layer, 3" total thickness, over that part of ceiling extending 48" on each side of all partitions.

3.8 Plenum Sound Barriers
Install THERMAFIBER blankets; cut vertical blankets as necessary to clear plenum obstructions:

3.8.1 Upside Down "T"—Lay horizontal blankets on ceiling grid extending 1' on either side of partition centerline and lean vertical blankets against hanger wires for support.

3.8.2 Vertical Barrier—Lean vertical blankets against hanger wires for support over partition centerline.

3.8.3 Tent Barrier—Lean blankets together over partition centerline and wire or clip tops together.

Product Index

Pattern	Page	Color Availability		
		White Only	White Plus Selected Colors	All Colors
Allegro	24			X
Aspen	25			X
Aurora	25	X		
Calypso	24			X
CERAMIC HERITAGE	36	X		
Checkline	15		X	
Checkmate	15		X	
Chex/4	15		X	
Chex/16	15		X	
Chex/36	15		X	
CLEAN ROOM	35		X	
Corona	28			X
DESIGNER SQUARES	20		X	
ECLIPSE	6	X		
"F" Fissured	16			X
Fine Fissured	28			X
Fissured	29	X		
Frost	12			X
Frost Renditions	5			X
GLACIER	13			X
Gypsum Lay-In Panels	34	X		
Hi-LITE Kapok	33	X		
Hi-LITE Twill	33	X		
Hi-NRC Fine Fissured	26			X
Hi-NRC Omni Fissured	26			X
ILLUSION Ceiling Series	22		X	
IMPACTION System	32	X		
LINEAR EXPRESSIONS	10			X
METAL FACE (Perforated)	36	X		
METAL FACE (Unperforated)	36	X		
Natural Fissured II	27	X		
Omni Fissured	27			X
ORION 210	8	X		
ORION 220	8	X		
ORION 230	8	X		
ORION 270	8	X		
PEDESTALS, ACOUSTONE	15			X
PEDESTALS, AURATONE	19		X	
Pebbled	30	X		
Pin-Perforated	30	X		
Pin-Perforated II	30	X		
PREMIER Fine Fissured	26			X
PREMIER Natural Fissured II	26	X		
PREMIER Nubby	33	X		
PRISMS	20		X	
PROFILE Series	18		X	
ROCK FACE	32	X		
Sandrift	11			X
Super-E (Micro-Perforated)	36	X		
Super-E (Unperforated)	36	X		
Surf	24		X	

For further information . . .

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USG Interiors, Inc.

SA-906

INTEGRATED CEILINGS[™] Specialty Products



USG

Table of Contents

TRANSPARENCIES Ceilings, Walls and Windows	3
INTERSECTIONS Ceiling System	4
INTERSECTIONS Air Diffuser	4
Geometrix Ceilings	5
MIRRAPLANE® Ceilings	6
Celebration Ceilings	7
Celebration Air Diffuser	7
SPECTRA Ceilings	8
VISTA SONIC Ceilings	8
IMPRINTS Ceilings	8
PIPE AND JUNCTION Systems	9
SPACECUBE® Ceilings	9
ACRYLICUBE® Ceilings	9
PARALINE® Ceilings	10
LINEA® Ceilings	11
SKYFRAME Modular Skylights	12
LIGHTFRAME Ceilings	12
DONN® COORDINATOR® Ceilings	13
SILENT SQUARES® Ceilings	14
SILENT EXPRESSIONS Ceilings	14
SILENT 65 and SILENT 95 Walls	15
SILENT BAFFLES and SILENT TOUCHES	16
BANNERS Systems	17
Special Order Products	18

USG Interiors, Inc. is proud to offer the industry's most innovative resource of specialty ceilings and decorative systems. Developed for unique architectural settings, our **INTEGRATED CEILINGS** specialty products transform open ceiling planes into spectacular, artistic spaces. Complete systems come to the jobsite pre-engineered, fitted, painted and ready for installation.

Dozens of products are available, including luminous skylights, elegant reflective surfaces, fabric-covered ceilings and walls, open plenum treatments, space frames and linear metal. From the unique **TRANSPARENCIES** "glass block" ceiling to the elegance of **SILENT COLLECTION** fabric-covered walls, our **INTEGRATED CEILINGS** products will meet your special needs.

Cover: **TRANSPARENCIES** Windows

Color photographs in this brochure show colors that are as close as possible to actual products. For exact finishes, see product samples offered by your USG Interiors sales representative.

TRANSPARENCIES CEILINGS, WALLS AND WINDOWS

TRANSPARENCIES panels give the same subtly refracted light play as traditional glass blocks, but with just a fraction of the weight, cost, and installation difficulties of glass. Lightweight, acrylic TRANSPARENCIES ceiling panels lay into a texturized DONN suspension system for fast, easy installation. Panels may be easily removed for complete access to the plenum space. TRANSPARENCIES Walls and TRANSPARENCIES Windows allow creative interplay among all areas of a room's interior.

For interest and drama, add a splash of color or change the color of the ceiling with new TRANSPARENCIES Highlighters available in red, green, blue, orange and yellow.



Standard designs:

TRANSPARENCIES 100 (Crushed Ice pattern), TRANSPARENCIES 200 (Icicle pattern), TRANSPARENCIES 300 (Ice Cube pattern), TRANSPARENCIES 400 (Melting Ice pattern).

Standard size: 2'x2' panels.

For TRANSPARENCIES ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.

Special pink TRANSPARENCIES ceiling was created for lobby of Flamingo Hilton Las Vegas.



INTERSECTIONS CEILING SYSTEM The INTERSECTIONS system provides an ingenious revision of the typical acoustical ceiling. This completely original system combines 2'x2' and 5"x5" modules using a single grid element. Installed at an 11½° angle to the perimeter of the space, the INTERSECTIONS ceiling system breaks away from the conventional look of rectilinear ceilings.

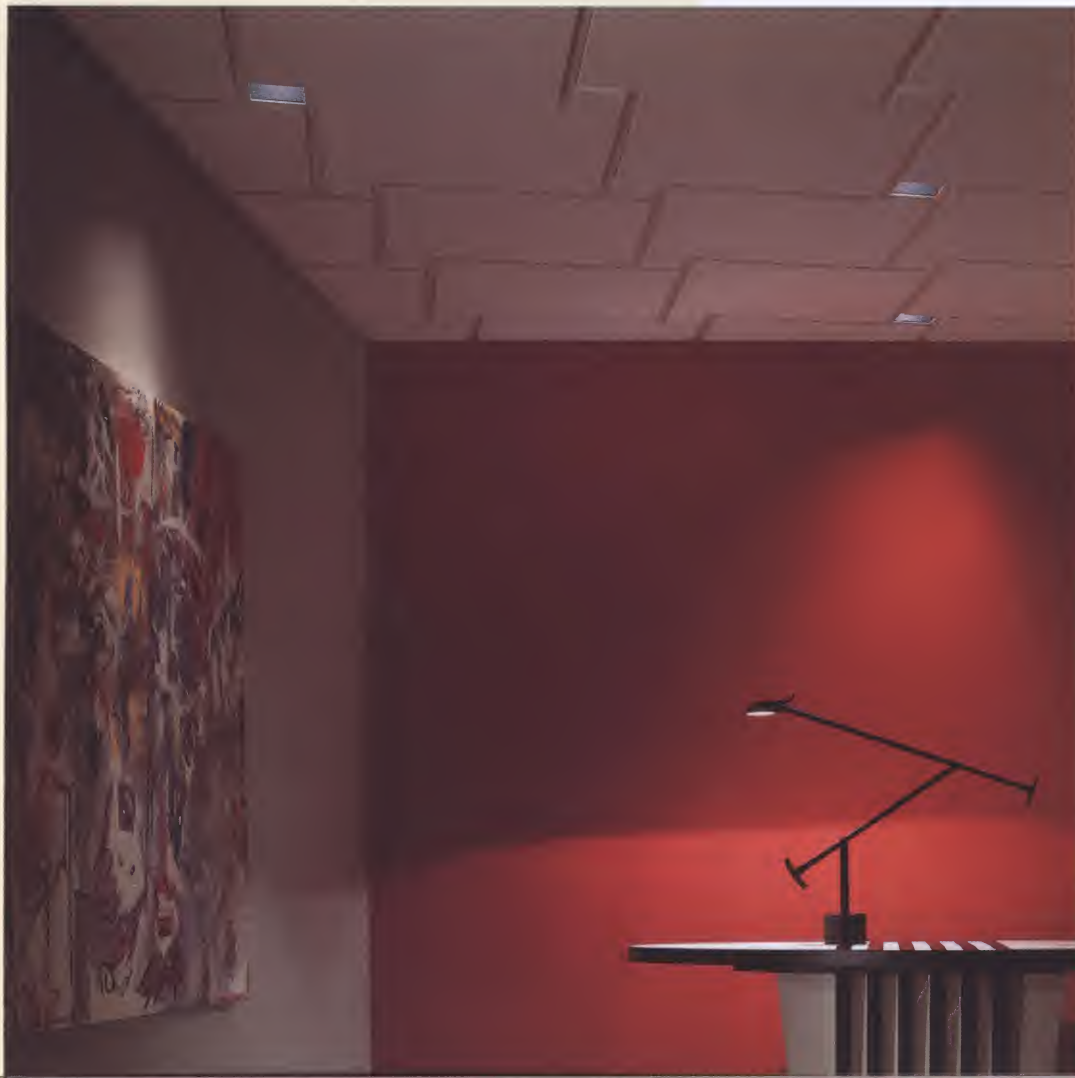
The system features ACOUSTONE Frost 2'x2' panels and already cut-to-size Frost 5"x5" accent panels. Or the smaller modules can accommodate recessed incandescent light fixtures, sprinklers, speakers or simply colored accent inserts.

INTERSECTIONS island trim preserves the floating perimeter while framing the ceiling with a finished, mitered edge.

Standard panel sizes: 2'x2' and 5"x5".

Standard grid size: 29" length, 1½" height, 1⅝" face.

Standard colors: Flat White, Manila, Silvertone, Parchment, Taupe, Mist.



GEOMETRIX CEILINGS Geometrix panels echo the geometry of suspension grid lines with symmetrical, screen-printed patterns. A single pattern can be used across the entire ceiling to create a clean, graphic design. Patterns also can be combined to build unique overall designs or to accent perimeter areas. Panels install into finely crafted Finline 1/8 suspension to provide a unique, almost monolithic pattern.

Matrix panels and Finline 1/8 suspension system.



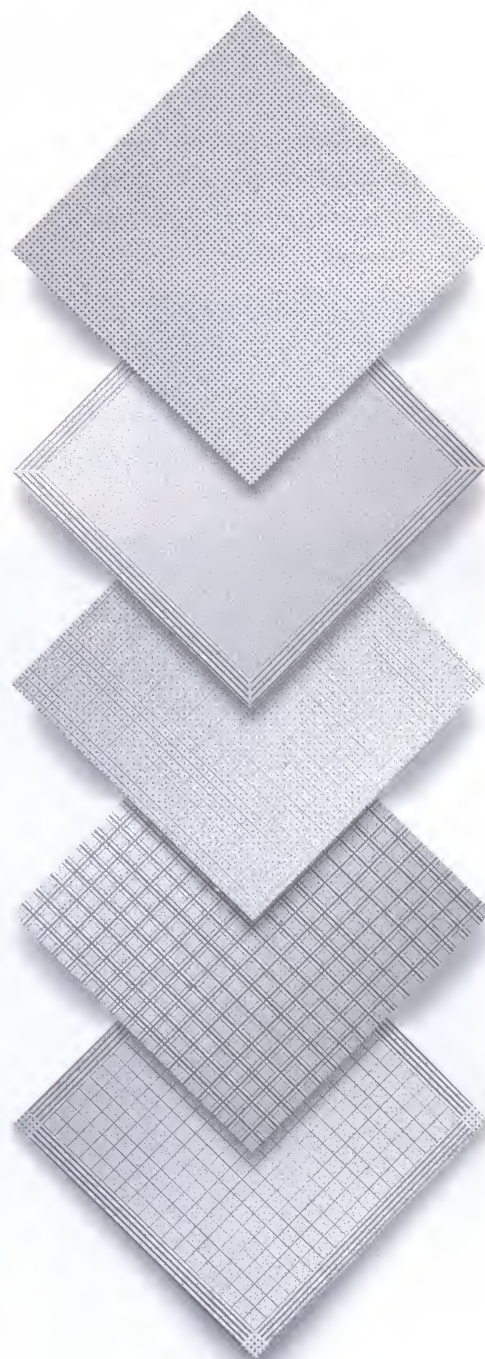
Minuend**

Miter

Matrix

Micron

Metro



Standard designs: Minuend, Miter, Matrix, Micron, Metro.

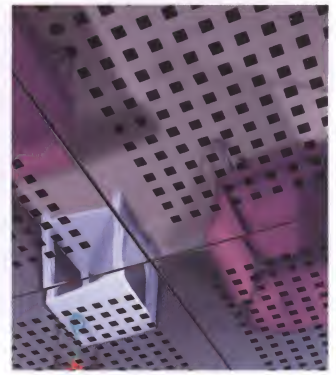
Standard colors: Gray/white patterns*, white suspension.

Standard size: 2'x2' panels.

* Special screened colors are available upon request.

** Coverage of design can be ordered across the entire panel or in just one, two, or three quadrants.

MIRRAPLANE CEILINGS Premium grade, highly polished stainless steel MIRRAPLANE panels have a rich luster and taut, flat appearance. Or the panels may have square or round perforations to accommodate acoustical requirements. Suspended on a unique concealed grid with only a hairline joint between panels, MIRRAPLANE ceilings present an almost seamless mirrored plane. Installation is easy; each panel can be lowered on torsion springs for easy access to plenum space above. MIRRAPLANE panels can be tinted in Smoke, Brass, Bronze, Blue and Champagne to add even more visual excitement.



*MIRRAPLANE MP-300 ceiling.
MIRRAPLANE MP-200 ceiling.*

Standard designs: Unperforated (MP-100), round perforations (MP-200), square perforations (MP-300).

Standard size: 2'x2' panels.

MIRRAPLANE MP-100 ceiling.

CELEBRATION CEILINGS

Sophisticated

Celebration panels of anodized aluminum are dramatically space extending, making rooms seem longer and wider. Painted Celebration panels create clean-lined, contemporary ceilings. Choose elegant fabric-covered panels for special areas, or express the essence of natural metals in galvanized or polished stainless finishes. All Celebration ceilings combine great looks with the hidden strength of metal.

Celebration panels are easily snapped into standard DONN FINELINE grid. The finished Celebration ceiling presents an elegant graphic design with panels that seem to float within the reveal surrounding them. Panels can be easily removed for fast access to the plenum.

Satin-finish Celebration ceiling.



Fabric-covered Celebration ceiling incorporating Celebration air diffuser.



Anodized reflective finishes:

Chrome, smoke and brass colors in polished or satin finish.

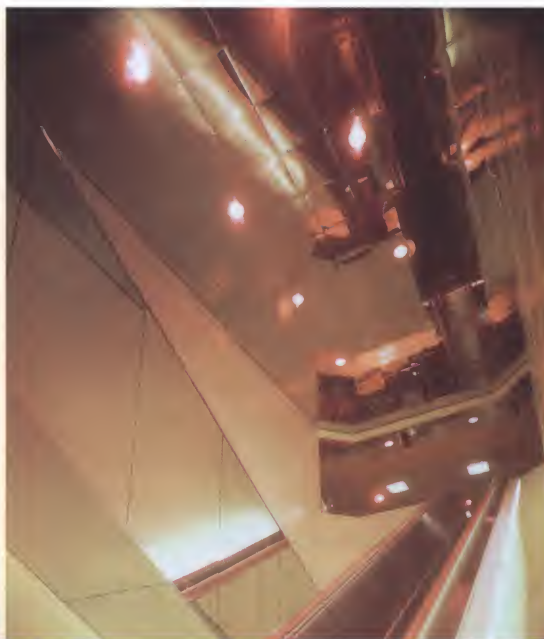
Natural metal finishes: Spangled galvanized and 430 stainless steel.

Other standard finishes: Painted (smooth or perforated), fabric-covered (Guiford FR701).

Standard panel size: 2'x2' (30"x30" on special order).

SPECTRA CEILINGS The ultimate in reflective ceiling simplicity: premium grade clear stainless steel panels lay into a DONN DX® suspension that is capped in polished chrome. The result is a quality mirrored surface at a budget price. SPECTRA panels can be field cut to accommodate columns and walls. A standard chrome-capped angle provides a finished perimeter at the wall. ►

Standard panel size: 2'x2'. Other sizes on special order.



IMPRINTS CEILINGS IMPRINTS panels express the art of pressed metal ceiling design while providing the instant access to the plenum required for contemporary spaces. Steel panels are installed in DONN grid in matching colors. ◀

Standard designs: Contempo concentric circles (IM-100), Art Deco domes (IM-200), Western squares (IM-400).

Standard finishes: Polished brass, polished chrome, ivory baked enamel.

Standard size: 2'x2' panels.



VISTA SONIC CEILINGS A safe, shatterproof, economical alternative to mirrored glass tile, only VISTA SONIC panels combine sound absorption with a mirror-quality finish. VISTA SONIC panels are made of tough, aluminized-polyester film stretched over a framed, mineral fiber acoustical panel. These panels are damage resistant and flex under minor impact. They install easily into standard DONN grid and are anti-static for minimal cleaning. ►

Standard colors: Silver, brushed silver, gold, bronze, pearl white and black reflective.

Standard size: 2'x2' panels.



SPACECUBE CEILINGS This nonmodular open cell system brightens ceiling areas while allowing existing lighting and HVAC to filter through.

Economical 2'x4' modified CENTRICITEE suspension system disappears into the continuous louver design. Provides 100 percent accessibility—looks great even after repeated access. ►

Standard finish: Off-white.

Options: Custom colors.

Standard cell sizes: 4"x4", 8"x8" and 12"x12", 2 1/8" high, 3/8" thick.



PIPE AND JUNCTION SYSTEMS Ingenious component parts system designed to create suspended or freestanding two- or three-dimensional open structures. Lightweight, inexpensive roll-formed pipes and 2-piece die-cast junctions can be combined into virtually any flat or cubed arrangement. New PJCR 90 radius pipe adds graceful curves and infinite design possibilities. Decorative, structural PIPE AND JUNCTION modules can support lighting fixtures, signs and banners, and they are easy to assemble, disassemble and store for future use. ►

Standard finishes: Painted white, bright chrome casting with polished aluminum pipe.

Other options: Polished brass, custom colors.

Standard modules: 2', 30", 3'.

Standard fabric inserts: Bright primary colors in cotton or polyester.

ACRYLICUBE CEILINGS Luminous ACRYLICUBE ceilings bring a warm, sophisticated effect to interior spaces. ACRYLICUBE panels are installed into a direct hung DONN suspension system that completely disappears into the louver design, creating a ceiling that is uninterrupted by visible grid supports. Each louver is covered by a flat, clear prismatic or opal white diffuser that softens fluorescent lighting from above. ◀

Standard colors: White with opal white diffuser and white suspension, bronze with clear prismatic diffuser and black suspension.

Standard size: 1'x2' panels.

For ACRYLICUBE ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.



PARALINE CEILINGS Elegant, imaginative linear metal ceilings with clean, crisp lines. PARALINE ceilings are ideal for vast, expansive areas and can be curved to change the dimension of the ceiling plane. PARALINE features the economical alternative of steel for interior spaces. UL-tested 2-hour and 3-hour fire ratings are available.

Three styles are offered. PARALINE I and PARALINE III pans feature open reveals that will take advantage of acoustical material in the plenum; NRC ratings are available on request. Closed reveal PARALINE II pans are appropriate for exterior ceiling applications under protected soffits as well as interior applications. For more information, see detailed PARALINE literature and technical data offered by your sales representative.



Type of metal: Steel or aluminum (PARALINE I and II), aluminum (Paraline III).

Style: Perforated or unperforated (PARALINE I and II), unperforated (PARALINE III).

Standard colors: Six standard paint colors, plus custom colors.

Metallic finishes: Polished aluminum, polished smoke, polished brass, brushed aluminum (PARALINE I and II only).

Texturized finish: Available on PARALINE I and II only.

Standard sizes: 3 $\frac{1}{4}$ " x 12' x $\frac{3}{4}$ " (PARALINE I and II), 7 $\frac{1}{4}$ " x 12' x $\frac{3}{4}$ " (PARALINE III).

LINEA CEILINGS Roll-formed aluminum baffles create a one-directional open-plenum linear ceiling. Baffles attach to a 4'x4' flat black DX suspension system with a clip that allows easy removal to access services above. Attachment clips provide for any alignment of baffles to the grid for unlimited design possibilities. Ideal for remodel work by attaching LINEA baffles to existing 15/16" grid. Use with unique DX OS suspension to create barrel vaults or wave ceilings—consult your USG Interiors sales representative for application information.



Standard finish: Off-white (custom finishes also available).

Standard sizes: 6", 8", and 12" baffles all in 12' lengths.

SKYFRAME MODULAR SKYLIGHTS

SKYFRAME assemblies express the feeling of traditional skylights, providing the illusion of natural daylight. These modular skylights lay into DONN DX ceiling grid and, with a rise of only 8", can fit in plenums as shallow as 11". Light is provided from above by inexpensive fluorescent strip fixtures. SKYFRAME assemblies are shipped in kit form for quick field assembly. A pre-engineered light plenum kit is available to soften and direct the light downward for increased efficiency.

Standard light diffuser: Flat matte opal white acrylic.

Optional light diffuser: Wireglass pattern.

Standard grid finish: Charcoal bronze (#957).

Standard module sizes: 4'x4' (special square sizes can be custom ordered).

LIGHTFRAME CEILINGS Luminous panels and bold grid recesses form the unified LIGHTFRAME ceiling design. Fluorescent light is softly diffused through opal white acrylic panels, giving the feeling of natural light and an illusion of generous open vertical space. Each panel consists of a framed luminous diffuser that fits into DONN DX suspension for easy installation.



Standard diffuser: Flat matte opal white acrylic. Wire reinforced glass pattern diffuser on special order.

Standard grid finishes: Charcoal bronze (#957), walnut.

Standard module sizes: 2'x2', 2'x3', 2'x4'.

For SKYFRAME and LIGHTFRAME ceilings, it is recommended that fluorescent strip fixtures be placed a minimum of 18" above the ceiling and 18" o.c. for best results.

DONN COORDINATOR CEILINGS DONN

COORDINATOR 5'x5' modules scale down expansive ceilings. Utilities and services can be incorporated into the runners to eliminate interruptions in the ceiling panels. A choice of flat, coffered and pyramid designs offer options to meet every space planning requirement.

Module styles: Coffered, pyramid, flat, one-directional.



SILENT SQUARES CEILINGS

SILENT SQUARES panels offer an exclusive combination of luxury and efficient sound control. Panels are installed into DONN exposed suspension systems in coordinating or contrasting colors.

Standard fabrics: Elegance wovens in 12 colors, Elegance Donegal tweeds in 6 colors, Classics plush-textured fabrics in 12 colors.

Edges: Radius Reveal, Interline Square, Interline Radius.

Standard size: 2'x2' panels.

SILENT EXPRESSIONS CEILINGS

SILENT EXPRESSIONS custom-embossed panels using your exclusive design can express a subtle reference to a company image or a bold monogrammed statement. Four tasteful designs are also offered as standard patterns. Panels are installed into conventional exposed suspension systems in matching or contrasting colors.

Standard designs: EXPRESSIONS I, II, III, IV.

Standard fabrics: Classics plush-textured fabrics in 12 colors.

Edge: Radius Reveal.

Standard size: 2'x2' panels.



SILENT 65 AND SILENT 95 WALLS

Beautiful SILENT wall panels install easily on steel studs, masonry walls or gypsum drywall. Mineral fiber and glass substrate walls absorb up to 65 percent and 95 percent of sound respectively.



Standard fabrics: Elegance wovens in 12 colors, Elegance Donegal tweeds in 6 colors, Elite ribbed textures in 12 colors, Classics plush-textured fabrics in 12 colors.

Standard size: 30"x9', 30"x10'.

SILENT BAFFLES SILENT BAFFLES add interest to the ceiling above and define floor space below, while providing acoustical absorption to reduce sound reverberation.



SILENT TOUCHES Sound absorbing SILENT TOUCHES enhance wall surfaces.

Standard fabrics: Classics plush-textured fabrics in 12 colors.

Standard widths: 12" to 48" in 6" increments.

Standard lengths: 1' to 8'.

Standard fabrics: Elegance wovens in 12 colors, Elegance Donegal tweeds in 6 colors, Classics plush-textured fabrics in 12 colors.

Standard widths: 12" to 48" in 6" increments.

Standard lengths: 1' to 8'.



BANNERS SYSTEMS BANNERS systems allow the creation of soft flowing ceilings and color accents available through no other medium. Fabrics of 100 percent polyester with cotton silk-screening options provide unlimited colorful designs.



INTEGRATED Ceilings special order products make up a unique offering of luminous skylights and other decorative ceiling systems that complete our line of specialty products. These systems are engineered to your stringent requirements and delivered with complete shop drawings for fast, error-free field assembly and installation.

INTEGRATED Ceilings special order products are manufactured to order by trained factory personnel. This cooperative process transforms your unique architectural requirements into complete ceiling solutions that define the space to your exact needs. For more information, contact your USG Interiors sales representative.



SKYVAULT CEILINGS Contemporary design meets ancient art in this dramatic ceiling. With its barrel-vault design, the SKYVAULT system gives the feeling of ancient Roman architecture, while the clean, crisp appearance gives this ceiling a classic elegance. SKYVAULT modules can be used to span vertical surfaces or mounted as a half vault for perimeter lighting. ▲

SKYLITE CEILINGS SKYLITE ceilings offer the beauty of a natural skylight, providing the warmth and brightness of daylight. Lightweight extruded aluminum grid members can be formed into square, rectangular or triangular shapes. Light is provided from above the SKYLITE by inexpensive fluorescent strip fixtures. ◀



QUADRADOME® CEILINGS Flat panels join together for a simple, highly graphic design. Or the QUADRADOME module can be raised above the ceiling line with attached riser panels to form a skylight. QUADRADOME skylights can be installed either concave or convex. The lightweight extruded aluminum grid assembly is suspended by hanger wires. ►

LIGHTRIUM® CEILINGS Luminous adjacent pyramids constructed of extruded aluminum provide an efficient source of shadowless light. Pyramids may point up or down. Optional incandescent lights can be used at intersections to add sparkle. ►



ROTUNDA® CEILINGS An ingeniously designed dome support system. Grid members can be joined from as many as eight different directions. ROTUNDA domes can be installed either concave or convex. ►

SPACELINE CEILINGS A decorative suspended beam structure consisting of lightweight aluminum beams connected by injection-molded intersection hubs. Downlights or track lighting systems can be placed within or below the suspended SPACELINE ceiling plane. ▼



MIRRALITE CEILINGS The glamour of exposed incandescent lighting and the deep reflections of premium stainless steel panels are combined in one ceiling design. The MIRRALITE system places a die-cast fitting at each grid intersection, which incorporates the light socket assembly while allowing grid junctions to be made using standard clips. Installation is fast and easy. MIRRALITE ceilings can be fitted for almost any ceiling height and size. ►



LEAN-TO CEILINGS LEAN-TO ceilings give the illusion of a single-sloped, linear skylight. Warmth and light are provided by fluorescent strip fixtures diffused through acrylic panels. LEAN-TO skylights are an ideal way to give a linear look to perimeter areas. They also can be inverted when plenum space is limited. ►



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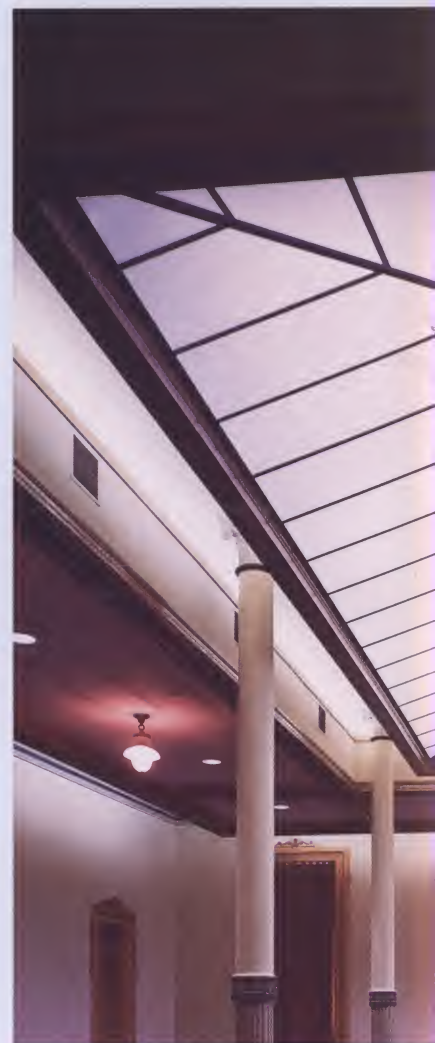
Table of Contents

SKYLITE™ Ceilings	3
LIGHTRIUM® Ceilings	3
LEAN-TO™ Ceilings	4
QUADRADOME® Ceilings	5
SKYVAULT™ Ceilings	6
ROTUNDA® Ceilings	7
MIRRALITE™ Ceilings	7
SPACELINE™ Ceilings	7

USG Interiors, Inc. is proud to offer this extraordinary collection of special order ceilings. Developed to offer imaginative solutions for highly visible areas, these spectacular ceiling products transform ordinary spaces into unique architectural settings.

Complete ceiling systems are sent to the jobsite pre-engineered, fitted, painted, and ready for assembly. Detailed shop drawings with assembly instructions accompany every special order ceiling.

Dozens of options are available, including custom sizes, shapes and colors. All special order ceilings are specifically designed to meet customer needs.



Cover: LIGHTRIUM Ceiling

Color photographs in this brochure show colors that are as close as possible to actual products. For exact finishes, see product samples offered by your USG Interiors sales representative.

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SKYLITE CEILINGS SKYLITE ceilings offer the beauty of a natural skylight, providing the warmth and brightness of daylight. Lightweight extruded aluminum grid members can be formed into square, rectangular or triangular shapes. Light is typically provided from above by inexpensive fluorescent strip fixtures.



Traditional Junctions: Inverted T-bar grid members are precut and prepunched for simple field connection. Special splice and connector clips are also provided.

Trim Beam Junctions: Bolder, more structural members are prenotched to snap in place for easy assembly. Special clips secure junctions, prevent light leaks and hold diffuser panels in place.

Standard Light Diffuser: Flat matte opal white acrylic.

Optional Light Diffuser: Wire reinforced glass pattern diffuser (special order).

Standard Grid Finish: Charcoal bronze (#957). Custom finishes are also available.

Module Size: Available in any size (can also be specified in metric sizes).

LIGHTRIUM CEILINGS Luminous tangent pyramids constructed of extruded aluminum provide an efficient source of shadowless light. Pyramids may point up or down. Optional incandescent lights can be used at intersections to add sparkle.

Junctions: Die-cast junctions permit modified T-bar grid members to join together from 8 different directions and elevations.

Standard Light Diffuser: Flat matte opal white acrylic.

Standard Grid Finish: Charcoal bronze (#957). Custom finishes are also available.

Optional Grid Finishes: Any baked enamel color (special order).

Module Size: Pyramids on 2½', 3' or 4' centers.



LEAN-TO CEILINGS LEAN-TO ceilings give the illusion of a single-sloped, linear skylight. Warmth and light are provided by fluorescent strip fixtures diffused through acrylic panels. LEAN-TO ceilings are an ideal way to give a linear look to perimeter areas. They also can be inverted when plenum space is limited.



Traditional Junctions: Inverted T-bar grid members are precut and pre-punched for simple field connection. Special splice and connector clips are also provided.

Trim Beam Junctions: Wider and deeper struts offer a bolder, more structural appearance. Special clips secure junctions, prevent light leaks and hold diffuser panels in place.

Standard Light Diffuser: Flat matte opal white acrylic.

Optional Light Diffuser: Wire reinforced glass pattern diffuser (special order).

Standard Grid Finish: Charcoal bronze (#957). Custom finishes are also available.

Module Size: Available in any size (can also be specified in metric sizes). Panels sloped more than 45° are not recommended.

QUADRADOME CEILINGS Flat panels join together for a simple, highly graphic design. Or the QUADRADOME module can be raised above the ceiling line with attached riser panels to form a skylight. QUADRADOME ceilings can be installed to be either concave or convex. The lightweight extruded aluminum grid assembly is suspended by hanger wires. Light is typically provided from above by inexpensive fluorescent strip fixtures.



Junctions: Inverted T-bar grid members are precut and prepunched for simple field assembly. Special splice and connector clips are also provided.

Standard Light Diffuser: Flat matte opal white acrylic.

Optional Light Diffuser: Wire reinforced glass pattern diffuser (special order).

Standard Grid Finish: Charcoal bronze (#957). Custom finishes are also available.

Module Size: Available in any size (can also be specified in metric sizes).

SKYVAULT CEILINGS Contemporary design meets ancient art in this dramatic ceiling.

With its barrel-vault design, the SKYVAULT system gives the feeling of ancient Roman architecture, while the clean, crisp appearance gives this ceiling a classic elegance. SKYVAULT modules can be used to span vertical surfaces or mounted as a half vault for perimeter lighting. Light is typically provided from above by inexpensive fluorescent strip fixtures.



Traditional Junctions: Precut main and cross beams connect to four-way aluminum junctions by means of self-tapping screws.

Trim Beam Junctions: Main runners and cross beams are premitered to snap in place for easy grid assembly. Special clips secure junctions, prevent light leaks and hold diffuser panels in place.

Standard Light Diffuser: Flat matte opal white acrylic.

Optional Light Diffuser: Wire reinforced glass pattern diffuser (special order).

Standard Grid Finish: Charcoal bronze (#957). Custom finishes are also available.

Module Size: Available in any size (can also be specified in metric sizes). Panels are pitched 9° above horizontal at the center bay, 27° at the second bay and 45° at the outer bay.

ROTUNDA CEILINGS An ingeniously designed dome support system. Grid members can be joined from as many as eight different directions. ROTUNDA domes can be installed either concave or convex. Light is typically provided from above by inexpensive fluorescent strip fixtures.



Junctions: Modified grid members are pre-engineered for simple field assembly and connection to the die-cast grid junctions.

Standard Light Diffuser: Flat matte opal white acrylic.

Optional Light Diffuser: Wire reinforced glass pattern diffuser (special order).

Standard Grid Finish: Charcoal bronze (#957). Custom finishes are also available.

Module Size: Available in any size (can also be specified in metric sizes).

MIRRALITE CEILINGS The glamour of exposed incandescent lighting and the deep reflections of premium stainless steel panels are combined in one ceiling design. The MIRRALITE system places a die-cast fitting at each grid intersection, which incorporates the light socket assembly while allowing grid junctions to be made using standard clips. Installation is fast and easy. MIRRALITE ceilings can be fitted for almost any ceiling height and size.

Module Size: 18", 24" and 30" square modules allow lamps to be placed 18", 24" or 30" on center. Custom sizes are also available.



SPACELINE CEILINGS A decorative suspended structure consisting of lightweight aluminum beams connected by molded plastic spacers. Downlights or track lighting systems can be placed within or below the suspended SPACELINE ceiling plane.

Module Size: Available in any size (can also be specified in metric sizes).



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Note: All products described here may not be available in all markets. Consult your representative for more information.

Notice: We shall not be liable for any loss caused by goods not in accordance with printed instruction or intended use. Our liability is limited to replacement. Any claim shall be made in writing to the nearest branch office within 90 days from date it was received. It should have been made at that time.

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1992 Architectural Reference Library



This new series of technical folders replaces the 1991 editions with four exceptions:

- SA-920 *USG Plaster Products, Accessories and Systems*
- SA-923 *Steel Framed Drywall Systems*
- SA-924 *Wood Framed Drywall Systems*
- SA-928 *TEXTONE Vinyl-Faced Gypsum Panels*

These folders should all be retained in their 1991 editions. Two folders have been added to the Architectural Reference Library: SA-727 *USG Firestop System for Floor and Wall Penetrations* and SA-907 *INTEGRATED CEILINGS Special Order Products*.

New features in the 1992 Library are:

Div. 1 Selector

Partition and ceiling sections have been reorganized to make the *Selector* easier to use and to include many additional tests. (SA-100)

Div. 5 Steel Framing Systems

Revised Unimast Incorporated catalog includes product descriptions, section properties, span and load data, limiting heights and other technical information on steel framing systems. (UN-30)

Div. 7 Exterior Cement Board Systems

Exciting new colors are part of the selection for DUROCK Exterior Finish. New 32" wide DUROCK RB is now available for exterior

and interior applications. DUROCK Exterior Cement Board Systems are now backed by a comprehensive 10-year limited warranty. (SA-700)

Div. 7 Insulation Systems

Lists UL tests for which safing insulation is the preferred forming material. Describes WJE fire test for safing insulation. References new USG Firestop System for floor and wall penetrations. New photography added. (SA-707)

Div. 7 Firestopping

New USG Firestop System for floor and wall penetrations employs the newly developed FIRECODE Compound applied to THERMAFIBER Safing Insulation for a firestop system that combines economy and performance. (SA-727)

Div. 9 Ceiling Suspension Systems

Describes new FINELINE 1/8 Suspension System. Technical drawings of moldings added. New photography added. (SA-904)

Div. 9 Acoustical Treatments

Describes the ECLIPSE product line. Describes new ACOUSTONE Frost Renditions scored ceiling panels, ACOUSTONE Sandrift, and ACOUSTONE Chex/4 GLACIER surface Ceiling Panels. Describes new white vinyl laminated ORION 230 Ceiling Panels. References new FINELINE 1/8 Suspension System. Technical drawings of moldings added. New photography added. (SA-905)

BANNERS Systems added. References special order product line. New photography added. (SA-906)

Made-to-order ceilings developed from customer specifications include skylights, polished metal combined with incandescent lighting, and suspended decorative grids. Skylights can be concave or convex, barrel-vaulted, single-sloped, or domed. All ceilings are individually designed and manufactured to meet customers' needs. (SA-907)

Div. 9 Gypsum Board

USG Double Walls and USG Furring Walls are combined with USG Resilient/Steel Framed Systems to form the new *USG High Sound-Attenuation Steel Framed Systems* catalog. (SA-921)

Revised limiting height values for 4" and 2½" 25-ga. C-H studs used in shaft walls and unlined return shafts. Specification expanded to include relevant standards and provide new execution information. Added *12 Reasons to Choose USG Cavity Shaft Wall* highlights unique aspects of USG system. (SA-926)

New ¾" SHEETROCK brand Gypsum Panels, ULTRACODE Core, when used in appropriate systems, provide a 2-hour fire rating with single-layer construction (UL Design U491) and a 4-hour fire rating with double-layer construction (UL Design U490). (SA-923A, SA-927)

Div. 9 Interior Cement Board Systems

Revised specification includes information on hearth extensions. New range of products and sizes to choose from. (SA-932)

Div. 10 Specialty Partitions

New photography added. (SA-1020)

Div. 10 Access Floors

Catalog reorganized to focus on product lines rather than target markets. Describes new LOW-LOC Pedestal. New photography added. (SA-1027)

Div. 11 Security Walls

STRUCTOCORE Security Wall Systems provide continuous steel reinforcement for high-strength plaster base and finish; used for jail cell partitions, security vaults and other walls requiring high abuse-resistance. (SA-1119)

